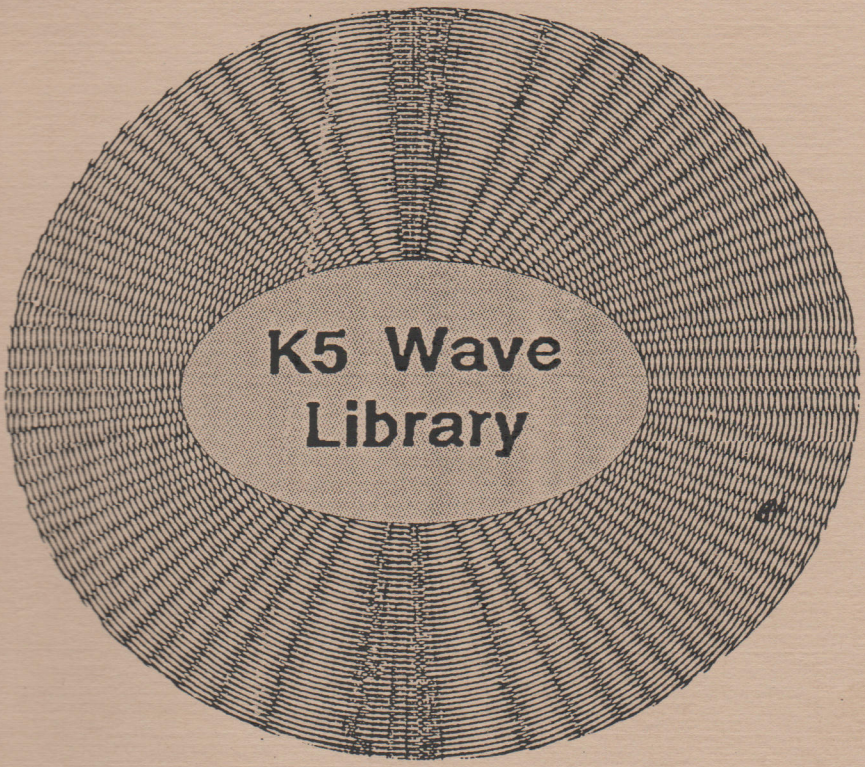

Jim's
204 California Avenue
Chattanooga TN
37415
(615) 877-6835
Software

The K5 Wave Library

K5 Wave Library

Thank you for purchasing the K5 Wave Library. I spent a lot of time putting this together, and I hope you find it a good investment.

Included with the IBM/Syntonyx version of the Wave Library are are seven banks of digitally converted waveforms, one bank of Auto-assigner demo patches, and one bank of patches carefully tweaked for live performance use. Documentation (which you are now reading) on the waveforms includes some general tips on programming the K5.

Wave Library sources include K1 waves, ESQ-1 waves, and an assortment of samples from Mirage. There is heavy emphasis on the two wavetable synthesizers because they represent excellent sound selections, and the tones are emminently useable.

Both the K1 and ESQ-1, though great-sounding from an esthetic viewpoint, are pretty grungy-sounding from a technical viewpoint. The converted waves sound quite similar when played on the K5, but the grunge is gone. Plus, the K5 offers processing features lacking in most wavetable synths, so K5 waves can "go through more changes" than on the parent synths.

For practical purposes, there is a finite number of ways an acoustic instrument can sound (Occam's Razor can only cut so close). In other words, if you convert 50 different trumpet samples, all the harmonics will be somewhat similar. I believe you can custom-build the patch you need from a generic wave faster than you can audition numerous trumpet patches programmed by someone unaware of your personal requirements.

Raw wave is actually a small part of a patch. The early analog synthesizers produced a tremendous range of sounds only using 4 generic waves. On the K5, the DFT, DDF, DDA, DFG, and keyscaling affect sound to a greater extent than the actual harmonic settings in the DHG. However, the DHG is the hardest part of the K5 to program. (OK, just off the top of your head, what harmonics make a Sitar?)

I hope you will be able to use the K5 Wave Library to make the K5 no more challenging to program than an ESQ-1.

Editing the Patches

Some musicians I know do not like the K5 all that much, and are pretty unimpressed with it's sounds. Since you own a K5, it is a safe bet that you are not in this group, so there is a good chance you will like some of these patches. If you wish to be initially impressed, please audition the Demo or K5Live banks first. These sounds are heavily tweaked, and I hope you might find a couple of keepers among them.

I tend to use more animation and detuning than some might find pleasant. If a sound is too animated for your taste, turn off DFG envelope modulation for starters, then try reducing the DFG detuning on the FINE parameters. If still too animated, check to see if **effect** is on in the DHG 2 page.

The Wavelib banks all have identical waveform on S1 and S2. I tried to walk a fine line; tweaking each patch enough to make it representative and unique, without using so much programming that the nature of the harmonics is completely masked. Under these constraints, Wavelib 4 is especially boring to play through, since it mostly consists of high-harmonic sounds which are best used for "spice" in a patch, rather than main course.

The K5 has many programming features; you can do many things with the Wave Library sounds. Although most synthesizer patches do not feature identical waveform on each oscillator, a patch built this way has a certain purity which allows a patch to carve its own niche in a mix. I have been burned by excessive synthesizer layering lately, because heavy layering tends to make a mix muddy and indistinct. You may like some of the Wavelib patches enough to use them as-is with a little tweaking. This is especially true with the Hammond sounds and analog sounds scattered here and there.

The next cool thing to do is pick out complementary pairs, merging S1 from one patch with S2 from another. This is essentially what most wavetable synthesizer programming is all about, and is an easy way to get almost unlimited variety of sound.

The Role of the K5

Synthesizers are our modern musical tools. Just as a screwdriver is practically useless when you need a lug wrench, the K5 may appear inadequate if used on tasks better done by other synthesis techniques. The K5 can sub for a sampler better than a screwdriver can sub for a lug wrench, but you are still better off having several synthesizers if you can afford them.

Piano and drums are best left to samplers and sample players (I do not consider samplers to be synthesizers, actually, since even the best samplers have poor real-time expressive capabilities). It is an excercise in frustration trying to get piano or drums from other synthesis families, however.

To get a wide variety of not-perfect-but-acceptable sounds, wavetable synths such as Kawai K1 or or Roland D-50 are the tool of choice. They have a wider palette of sounds than FM or additive synthesizers, and have better expressivity than samplers. These are especially useful for live playing.

FM synthesis is more expressive than anything other than the large dinosaur analog synthesizers, and kills anything else on many percussive sounds, but FM is disappointing on sustained sounds, drums, or acoustic

piano.

Analog synthesis, including digital hybrids such as Oberheim Xpander, Roland Super Jupiter, and Ensoniq wavetable readers, offers more cross-modulation possibilities than any other synth family. This is especially good for massive, non-imitative sounds with lots of expression.

Additive synthesis as embodied in the K5 can handle many of the tasks performed by the other synth families. The K5 can almost completely supplant the analog synthesizer. Some patches approach FM percussiveness, and the K5 can emulate many wavetable synthesizer sounds. When properly layered, the K5 can approach the massive density of D50 sounds, and does well at imitative voicing of everything but acoustic piano and drums. It seems best at synthesizing strings, brass, woodwinds, killer organs, bells, analog sounds, and some percussives such as rhodes, marimba, and acoustic guitar. The K5 produces good soft bass tones (less obnoxious for ballads than DX7 or many sampled basses), and offers many breathy or glassy new age sounds. It makes a better Hammond than anything you can find short of a big wood box made 30 years ago.

The K5 has good expressive capabilities, and the unique thing it offers is the freedom to create arbitrary harmonic structures not easily attainable from any other synthesizer family. I like the K5 a lot, but let me now spend a few paragraphs discussing percieved shortcomings which have dissatisfied some users.

One common question is, "If the K5 can generate any imagineable harmonic content, why can't I get it to sound exactly like a (fill in the blank)?" **In short, the K5 is not nasty enough.** There are many kinds of sound (such as wind noise, bow scrape, hammer clack, string buzz) which are structured, but have nothing to do with the harmonic series. We can get fancy and call them enharmonic components, or just call them noise. When I listen to a close-miked sample CD of a solo acoustic instrument, there are so many noise artifacts being generated by the instrument itself that I sometimes wonder why the engineer took such great care making the recording so hi-fi. Without these signature noises, you will never get a perfect copy of an acoustic instrument.

There is a hidden advantage to this perceived K5 shortcoming. If you do a recording using only squeaky-clean, punctilious samples of acoustic instruments, there will be a build-up of noise artifacts which will begin to mask individual musical parts. You will probably have to start using some pretty heavy equalization on the tracks to get them to lay together properly. If you then solo any one track, it will not sound all that realistic out of context. Since the K5 produces the harmonic essence of an instrument, it frequently will sit in a mix better than a sample, although it might sound thin when soloed.

Acoustic piano and bell tones have harmonics which are out of tune with each other, which is why the K5 does not do exact copies of these tones.

The Fourier series is the math which describes how an assortment of harmonics can produce a waveform. A fourier transform of a wave generates two sets of information, the amplitude of each harmonic, and the phase angle of each harmonic. The K5 does not allow phase angle adjustment of individual harmonics, and under some circumstances phase angle is distinctly audible. A partial way around this is to adjust relative phase angle between S1 and S2 by using DFG envelope modulation of pitch.

Analog filters move phase angle of harmonics near the filter cutoff point. When swept, an analog filter actually moves the pitch of harmonics it passes through, giving a denser sound than a digital filter which merely diddles the amplitude of harmonics. Analog filters also induce distortion which fattens up some sounds.

Acoustic instruments have multiple resonance points, caused by the interaction of the body of the instrument with the sound generating source. A violin has ten or more major resonances, and hundreds of minor resonances. Every note on a violin has a slightly different character, because the multiple body resonances cause phase shift and amplitude response unique to each pitch. Even samplers cannot begin to capture this effect unless they are multi-sampled at intervals no greater than a minor third. Vocals must also be heavily multi-sampled for best results.

A common old-style tool for adding body resonances is the formant filter bank. There never has been a commercially successful filter bank, but many old-line synthesists, including myself, used to build their own. A filter bank is usually twenty or more bandpass filters in parallel, producing a comb-filter effect which is especially good for enhancing animated sounds such as strings and horns.

A third-octave graphic equalizer can be used as a filter bank. Turn up several adjacent EQ bands; the phase and amplitude of harmonics will get diddled differently on each note you play (there is a distinct difference in sound between all faders at zero and all faders maxxed). For example, to emulate violin body resonances, start with the equalizer set flat. Beginning with the 300 hz slider, boost every other slider +6 dB. (+6 at 315 hz, 0 at 400 hz, +6 at 500 hz, 0 at 630 hz, etc.). Now cut the 1500 hz slider by -6 to -9 dB. This setting emulates a violin body, which has major resonances about every 2/3 octave starting at 300 hz, and a dip in response at 1500 hz. Almost any synth string is improved using this trick.

Similar comb filter effects are generated by short reverb or short multi-tap delays. I believe the comb-filter effect is a significant reason reverb is so popular on synthesizers. As an alternative to using EQ on a track, you might try a digital delay in the 0-20 ms. range (flange with sweep turned off). Careful tuning of delay time and feedback can give more sophisticated tone enhancement of a track than parametric EQ could ever do.

To summarize, if you need exact copies of acoustic instruments, a sampler or sample player is the tool of choice. However, a sample player is about as much a synthesizer as a CD player is. A synthesizer can create new tones, not merely mix and match old ones. This is ultimately the biggest role the K5 can play in your stack.

Programming the K5

Additive synthesis, the process of mixing harmonically related sine waves to form complex timbres, actually predates electronic technology. Possibly the earliest additive synthesizer was the nineteenth-century telharmonium (which mixed the outputs of tuned electical generators), though the telharmonium was predated a couple of thousand years by ancient Grecian wind harps which were tuned to the harmonic sequence.

Throughout the evolution from Hammond organs on up to Synclaviers and such, additive technology has been alluring but expensive. The Kawai K5 is one of the first mass-production additive synths affordable to the working musician.

The K5 as an Analog Synth

The K5's plethora of voice parameters initially makes it a bit intimidating to program. The multiple voice processing modules allow many programming strategies. To simplify initial programming efforts, one can use generic harmonic spectra then program the K5 like an analog synthesizer. Using the digital filter and digital amp on the geometric waves in Wavelib 1 and Wavelib 7, most typical analog sounds can be programmed (sync effects are the most notable exception). The K5 delivers rich and clean analog emulations, which is a definite asset for MIDI users who may not own an analog synth. The digital filter emulates a variable-slope, variable-Q analog lowpass filter, but apparently does not induce phase shift. This gives bright, punchy processing of broad-spectrum waves (like the sawtooth), sometimes reminiscent of those great Casio PD analog emulations.

Pure Additive

Another piecemeal strategy is to bypass the filter, doing pure additive synthesis with only the DHG envelopes. Each harmonic must be assigned to one of the four envelopes. I usually assign the meat of a tone to envelope 4 (shadow off!). Harmonics which occur only at specific times during the tone's evolution (transients) get assigned to the other three envelopes. Though the K5's four-envelope scheme is "stripped down" in comparison to the Synclavier or Synergy, it still gives more detailed control over tone than is available from analog or wavetable synthesizers, and more predictable control than is available from FM synthesis.

Frequently a purely additive tone will sound natural for only an octave or so, much the same problem as encountered with samplers. When a patch is played above its optimum range, it usually becomes excessively bright. Played too low, a patch loses midrange punch. As with a sampler, one can program a multi-split to get around this problem, or use keyboard scaling and the DDF to increase the useable range. One would program a pleasing low or mid-frequency patch with the DHG section, then use keyscaling modulation of the filter or higher harmonics (DHG 2 page) to attenuate the excessive high frequencies which creep in as one plays up the keyboard.

When programming the DHG's, stay aware of the harmonics actually necessary for a voice. The frequency of a harmonic equals the fundamental frequency multiplied by the harmonic number. A fundamental frequency of A-440 (A3 on the K5 keyboard) yields a 4.4 Khz tenth harmonic, 8.8 Khz twentieth harmonic, and 13.2 Khz thirtieth harmonic. The output filter seems to "brickwall" around 12 or 13Khz, but the K5 can generate clean high-amplitude signals right up to this barrier. For our A-440 example, harmonics 30 and above will be inaudible. When designing sounds to be played in the middle of the keyboard, the harmonics above 20 or 30 are irrellevant. On upper keyboard sounds, only the first ten or so harmonics are needed. Only in the bass ranges are all 63 harmonics even audible. This is why I almost always use twin mode on the K5. Full mode wastes an oscillator on harmonics which are usually inaudible.

The main practical use of full mode (both sources forming 126 harmonics) is to use S2 (transposed down several octaves) as a pitched noise source. In full mode all 63 harmonics of S2 span only one octave, so it makes great midrange tone clusters (pitched noise). Just dial up a bunch of harmonics for this application. This is how to get air and mallet strike tones. Usually turn the S2 filter off. Remember to experiment with pitch envelope, velocity, pressure, bend and LFO modulation to get maximum use of this effect.

Setting harmonics is like searching for a magic recipe. For higher pitches, the difference between a piano, a trumpet, or a violin is only the subtle mix of a few harmonics. Recognising the correct mix is easy, but finding it is difficult.

As a rough rule of thumb, a numerical change of 8 yields a 3 dB change in harmonic level in the DHG.

When utilizing all the K5 processing modules on a sound, it is best to use infinite sustain and release on the DHG envelopes which carry the sustained portion of the tone, handling the decay portion with the DDA envelope. This avoids interaction between the DHG and DDA envelopes, which can cause pumping effects and uneven decay. Transients can be handled with the combination of the other DHG envelopes and the DDF, using the keyboard scaling to smooth the overall keyboard tone balance via DHG and DDF modulation.

Even when modulated to its fullest by velocity, the DDA alone may not give the dynamic range between low and high velocity which you might want. Add velocity modulation of the DDF or use velocity modulation of one or more DHG envelopes (typically those envelopes carrying transients) to get more

dynamics out of a patch.

The attack portion of the DDF envelope is a little slow, and can steal punch from percussive sounds. Getting around this is easy. Merely set the initial filter cutoff high, reverse the direction of the envelope, and use negative filter envelope modulation. This starts each note with the filter opened up, so there is no attack delay. Then comes the tricky process of balancing the DDF keyscaling modulation (for even tone across the keyboard) with envelope modulation amount and the initial cutoff frequency of the DDF.

What Harmonics Make a Kazoo?

Setting harmonics is the biggest K5 programming challenge. I have studied published instrument plots, and have had limited success modeling tones by ear, listening to a source tone through a graphic equalizer, trying to match each octave of the source tone to a particular K5 harmonic mix and envelope setting. The easiest method, however, is to convert sampler files to harmonic data via computer, which is what the Wave Library is all about.

Some of the waves have two or more complete wave periods per page. For a two-period wave, all the odd harmonics from the FFT are "false" harmonics which only reflect the differences between the two wave periods. These may be interesting to retain in a sound (which is why I did not transpose them down for you); derive the "true" spectrum by transposing the DFG down one octave, then set all odd harmonics to zero. You may wish to compare the original with the transposed version. Send each version to one of the K5 sound sources. Make sure all patch parameters are identical on each source, and use coarse tune to put both sources in the same octave. Pan between S1 and S2 on the main edit page to compare.

Harmonics do not necessarily a sound make. Solo samples usually convert more accurately than ensemble samples. For some reason, large ensembles frequently yield harmonics which sound like a pipe organ or accordian. The sound is similar to the original sample when viewed with a real time analyser, but the ear hears little resemblance.

Be Honest with Thyself

There is a sensory psychology phenomena called habituation or adaptation. This deals with elevated perceptual threshold to repeated stimuli. Habituation to synthesizer tones comes from excessive exposure to the patch under development. Though at risk when programming any synth, one must be particularly cautious when programming additive. An early sign of this dread loss of objectivity is when you play a friend your ultimate string patch, the result of 72 hours of continuous tweaking, and he says, "How did you get such a great accordian sound?" In advanced stages, musicians have been observed writing album liner notes and doing magazine interviews about the deadly accuracy of their orchestral sounds, when an untrained listener might mistake some of them as Baldwin Fun Machine or Elka string unit.

The only ways I know to combat this perceptual self brainwashing is to make frequent A/B comparisons between your patch in progress and the tone you are trying to emulate, working on a single patch no more than an hour or so at a time. It also helps to actually use the patch in sample sequences.

Never ignore the beneficial effects of serendipity. Use a librarian and save everything that sounds even remotely interesting. At a later date some of your duds might sound more interesting than your final edits. I worked for hours on an acoustic piano sound which did not turn out well. Several days later I played the sound again and realized it was a pretty passable bright acoustic guitar, though it was a terrible piano.

Kawai offers free alternate patch banks. Their programmers have been very resourceful, and the alternate banks offer some excellent sounds. All K5 users should make sure they obtain these factory patches (never re-invent the wheel!). They currently have cards one thru eight, and card ten (No one knows where card nine went).

MIDI Recording with the K5

Most recording should be done in multi mode through the individual outputs. The K5 is a little noisy in single mode. Background noise is not reduced in multi mode, but the signal output is higher, yielding a S/N ratio similar to other synthesizers in its price range. If you do not mind soldering on your K5, contact Kawai for details on a simple resistor swap which fixes this problem. I prefer to work around the noise problem. Having performed electronic service for years, I firmly believe one should not fix what ain't broke!

K5 background noise is heavy in treble. Since the K5 can cleanly generate brutal levels of high frequencies, you can set up very bright patches, and actually turn down the high EQ on the mixer, yielding very quiet performance when necessary.

Each patch in a multi can be assigned a fixed number of voices, or assigned as VR (variable voice allocation). When a voice is stolen from one output and re-assigned to another output, you may get a barely perceptible click. If these tiny glitches become a problem, they can be avoided by using VR assignment on only one output, using fixed voice assignments to the other outputs.

I frequently use the K5 stacked with a TX81Z or EPS. Both the TX81Z and the EPS have excellent multitimbral capabilities, and their synthesis strengths complement the K5's weaknesses. FM synthesizers and samplers make excellent attack tones, but frequently dissapoint me on sustained sounds. Iwill stack synghs the same way LA or cross-wave synthesis works.

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© 1989 James Chandler Jr.
204 California Avenue
Chattanooga Tn 37415
(615) 877-6835

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Although I have gotten good use of my K5 over the past two years as a recording synth, I had never used the instrument much in a live setting. The times I had taken it to the gig, the musicians and singers thought it was a very powerful synthesizer, but sounded cold and sterile in the mix.

After completing the rest of the Wave Library project, and being very pleased with the way many of the patches sounded on tape, I had to rehearse a new drummer using my home studio as practice hall. I was alarmed at how the K5 was wimping out alongside of live bass, drums, and guitar, so I took a week or so to put this bank together.

I believe that live sounds have to be almost excessively animated and thick, or they fall flat by the time they hit the room. Live patches also need restricted dynamic range and longer-than-average decay times. A sound which decays a realistic amount might sound fine on tape or solo, but when mixed with other high-volume instruments, much of the decay tail is masked by the rest of the band, and all of a sudden your clavinet sounds like a banjo.

I mostly use bread-and-butter sounds for live work, having found little commercial use for Martian Chainsaws or Gongs-From-Hell. I went through all my original patches and all the Kawai Factory banks, looking for the fattest bread-and-butter sounds. I then analysed these "greatest hits" patches and took S1 from one great sound and S2 from another killer sound, then edited the final clones to be as "thick as a brick" as I could get them. After a few days of this, the old K5 was beginning to sound pretty commercial through my Sentry 100A monitors at home, so I took the K5 in to work for testing.

Much to my dismay, the K5 still did not sound that good through the JBL stage monitors. Lately I have been using Korg sampled grand, TX7, and ESQ-1 for my live stack. All these instruments fit together very well with no equalization at all. The K5 sounded very tinny,and still seemed to have hardly any animation at all, although at-home the patches had seemed to have very generous vibrato levels.

All the ESQ-1 patches had been tweaked on-stage for a couple of years and I have always received good comments about the sound of the strings, horns, etc, so I took the ESQ-1 home to A-B with the K5. Not surprisingly, the ESQ-1 sounded muddy and agitated over my studio monitors. Using a real-time-analyser, I adjusted the DFT on the K5 patches to roll off the highs substantially, then added larger amounts of looped DFG envelope modulation and LFO pitch modulation to thicken the sounds.

With the exception of harpsichords and cymbals, most real acoustic instruments do not have large amounts of energy above 5 khz or so, but the K5 can really kick it out in this range. This makes it easy to fall victim to excessive highs, like a cook adding too much salt to the soup by constant tasting. An instrument like Hammond organ really screams in the upper octave, but there are very few really high harmonics. Rolling off a K5 Hammond sound with the DFT makes it much fatter and realistic in the upper ranges.

K5 Live

	SINGLE A	SINGLE B	SINGLE C	SINGLE D
1	PRK ORG1	SAXAXE 1	JAMAICA	VOICE 1
2	PRK ORG2	SAXAXE 2	KALIMBA	VOICE 2
3	HAMND 1	CLARNET1	K STRAT	NICEST
4	HAMND 2	OBOE 1	ACGUITAR	ANALOG 1
5	PIPER 1	BASSOON	MX-SITAR	ANALOG 2
6	PIPER 2	FLUFLUTE	SUCCUBUS	BIGAIR
7	STRINGR1	TRRUMP 1	TUBEBELL	SNTHIO
8	STRINGR2	TRRUMP 2	FRETLESS	ROKKOR
9	CLAVINET	TRRUMP 3	ROTOBASS	ROKPAD 1
10	HARPSIE	TRRUMP 4	ROUNDER	ARISIA
11	VIBRUIBE	WHISTLE	SYNBASS1	K STUFF1
12	HARPO	"MONICA	TAURUS	SHIMMER

	MULTI A	MULTI B	MULTI C	MULTI D
1	STRINGS=	STRAT	K5*MULTI	BS*ORG 1
2	ORGAN 1	GUITAR	K5*MULTI	BS*ORG 2
3	ORGAN 2	STEEL	K5*MULTI	BS*STRNG
4	BIGPIPES	WOOD	K5*MULTI	SYBS*STR
5	CLAVYNET	HRMONIKA	K5*MULTI	BS*SAX
6	HRNSTACK	HARP	K5*MULTI	BS*TRUMP
7	SAXES	VIBES	K5*MULTI	HOLDON
8	HORN 1	SPACE 1	K5*MULTI	SOMEONE
9	HORN 2	BELL	K5*MULTI	K5*MULTI
10	WHISSELL	SPACE 2	K5*MULTI	K5*MULTI
11	FLUTE	KICK ASS	K5*MULTI	K5*MULTI
12	VOICE	SPACE 3	K5*MULTI	K5*MULTI

After rolling off the highs on most of the K5 patches, the K5 fit very well with the other keyboards and instruments on-stage. Our guitarist has a good ear for tone, and he feels that the K5 makes better Hammonds than any other keyboard I have had since I sold my Hammond. He is impressed with the basses and thinks the strings are almost as good as the ESQ-1 strings (by our judgement, the ESQ-1 is still live string winner over everything else we've tried, including TX7, numerous string samples, and D-50). He is not that fond of the horns and saxes, however, but he seems to prefer ramp-wave analog horns to the real thing.

I use two keyboards on-stage, lower straight to the mixer for piano and upper through a volume pedal for everything else. I leave the piano set at a standard level, and mix other patches in perspective to the piano. Our guitarist doubles on bass and I double on keybass, running a second output of the top keyboard to the bass amp so it is less noticeable as to exactly who is playing bass from song to song.

Using the K5M as top synth, I drive it from both keyboards using an Anatech **PocketThru**, with bottom keyboard sending MIDI channel 1 and the top keyboard sending channel 2. K5 output 1 goes to the keyboard mixer and output 2 goes to bass amp. K5LIVE patches are duplicated on internal and external, except external multis are all set to receive channel 2. Since I am driving a high-gain bass amp with output 2, the bass multi levels are set around 11 to match level with the bass guitar (I have to avoid using singles, or high-volume synth sounds come out of the bass amp). To play the K5M from the top keyboard, I select a card multi. To layer to the piano, I select an internal multi. This arrangement keeps me from having to keep an expensive MIDI patcher on the gig.

K5 Wave Library Demo Bank

All these patches were created with the Macintosh Auto-assigner program. Editing was done from the K5 front panel. For the most part, both S1 and S2 are identical except for differences in the DFG sections. Only a few of the programs use the DDF. Most programs rely almost entirely on cross-fading harmonic components using DHG envelopes. I have about a week of time invested in these, but I am sure you can do better on patches for your own use, since you will be going for what your mind's ear hears, something which no one else can do.

When analysing these sounds, first go to the DHG 2 page and selectively listen to each envelope, so you can hear each envelope's function.

CLAV - K50 Clav, K97 Clav, K156 Clav
Relevant harmonics were auto-assigned to envelopes 1, 2, and 3. To emulate a clack, high odd harmonics were manually assigned to DHG envelope 4 using a very fast attack, fast decay envelope, with another fast attack on release. This is supposed to give an attack clack, and another brief clack when the key is released, to emulate the mallet lifting from the string and briefly "snatching" it before the damper twine mutes the note. This effect is also used on the Rhodes patches, and AC BASS (to simulate the initial finger thump). By selecting high harmonics in various ranges, this technique can emulate thumps, clacks, clicks, and pings.

AC BASS - K55 Ac. Bass, K56 Ac. Bass
Relatively fast attack on envelope 1, relatively slow attack on envelope 2, the common harmonics on envelope 4, and a pluck synthesized on envelope 3.

LORHODE - (Wavelib 6) Low Rhodes Attack, Low Rhodes Sustain
Mid-range odd harmonics on envelope three to emulate the "flutter" of the hammer bouncing off the tine, with a second attack on key release to make the click of the damper settling on the tine. Rhodes goes sharp when struck, and fades flat when the damper hits the tine, so the DFG envelopes are set to emulate this. This is a subtle effect, so I tried to set it just below the audibly perceptible level.

HIRHODE - (Wavelib 6) High Rhodes Attack, High Rhodes Sustain
Same general setup as LORHODE. The Multi "RHODES" splits LORHODE and HIRHODE into a fairly useable electric piano.

KACGUIT - K52 Acoustic Guitar, K100 Acoustic Guitar

K VIBE - K51 Vibe, K99 Vibe, K150 Vibe

KPIKBASS - K58 Pick Bass, K163 Pick Bass

K FRETLS - K61 Fretless, K62 Fretless, K112 Fretless

K GLOCK - K66 Glockenspiel, K165 Glock, K164 Glock

K HARP - K68 Harp, K174 Harp
A good trick for your typical harp arpeggio is to run your hands up and down the black keys (you get a good feel for harp motion, and the scale is automatically pentatonic), then use your sequencer to transpose the track into the correct key.

K FHORN - K41 French Horn, K76 F. Horn, K77 F. Horn
I love french horn. I have several samples of french horn, and none of them sound like french horn. They all sound like poor analog brass. I do not know why french horn is so hard to duplicate.

K BRASS - K78 Brass, K147 Brass
I like K5 Brass constructed from ramp waves, or filtered from maxxed-out DHG settings (like PRSHORNS) better than any of my experiments using actual brass waveforms.

K STRING - K184 Violin, K235 String Loop, K43 String
I am not entirely happy with the auto-assigned harmonics derived from these three waves. You might try keeping the rest of this patch and searching for better DHG settings. I usually get the best musical results from fairly non-descript string pads. String patches which have too much character frequently sound like wierd trumpets when placed in a mix.

K RBASS - K60 Round Bass, K107 Round Bass

K STRAT - K103 Strat, K214 Strat attack, K214 Strat sustain

K CLARNT - K116 Clarinet, K117 Clarinet

K OBOE - K118 Oboe, K119 Oboe
The K5 has much better oboes than this hiding somewhere in its innards!

K ORBELL - K121 Orient Bell, K122 Orient Bell

K SITAR - K125 Sitar, K176 Sitar, K177 Sitar

K VOCALS - K131 Voice 1, K132 Voice 2

K FUZZ - K53 Fuzz Guitar, K54 F. Guitar, K101 F. Guitar
This patch uses envelope 4 to slowly fade in hashy grit made from a high harmonic cluster.

DIGIBASS - K57 Digibass, K160 Digibass, K193 Digibass

FLUTE - K63 Flute, K64 Flute
I know, I know, but without going to full mode and using S2 as a wind noise source, this is about as good as it gets.

SYNTH2 - K75 Synth2, K144 Synth2, K188 Synth2
One of the many ways to crossfade these synth tones.

SLAPBASS - K109 Slapbass, K219 PullBass, ESQ 38 Bass 2

ORCHESTRA - S1: K149 Orchestra, K147 Brass
S2: K44 String Pad, K85 String
Tried to get brass on one oscillator, and strings on the other oscillator, so the mix would have a "full orchestra" sound. The result has trouble holding its own by itself, but it does layer well.

SYN BASS - K113 Synth Bass, K114 Synth Bass, K180 Kalimba

STEELDRM - K129 Steel Drum, K130 Steel Drum, K182 Steel Drum
The main trick to steel drums seems to be radical amounts of de-tuning.

BIG - ESQ 1 Saw, ESQ 2 Bell, ESQ 3 Square
Crossfades radically different harmonics over time to make a big, shifty sound. It is not all that great by itself, but is surprisingly good as a layer behind something else.

PERFORMT - ESQ 22 Formant 1c, ESQ 23 Formant 2a, ESQ 29 Formant 4a
Three formants enveloped to try to emulate vowel shifts.

KALIMBA - K179 Kalimba, K180 Kalimba
Rapid DFG envelope modulation to enhance the thumb-picked effect. Kalimba patches are most realistic if played with only one finger on each hand, because these little African Pianos are usually played with thumbs only. Another good trick is to repeatedly play a "center" note alternately with both thumbs, simultaneously doing a pentatonic melody above and below that note using the fingers of each hand (kind of a two-finger clavinet part).

MED FUZZ - Mirage Med Fuzz Attack, Med Fuzz Sustain

ROMEBELL - Mirage Roman Bell Attack, Roman Bell Sustain
I removed all harmonics with intensity below 50.

M NYLON - Mirage Med Nylon Attack, Med Nylon Sustain

BASSOON - Mirage Lo Clarinet Attack, Bassoon Sustain

REED - ESQ 15 Reed, ESQ 1 Saw

M HARP - Mirage Med Harp Attack, Med Harp Sustain

M GONG - Mirage Med Gong Attack, Med Gong Sustain
The gong waveforms had too many noise components, so a lot of the lower-level harmonics actually masked the nature of the sound. I tried to improve this by removing all the harmonics with intensity below 50.

BOW BASS - Mirage Bow Bass Attack, Bow Bass Sustain

M BANJO - Mirage Med Banjo Attack, Med Banjo Sustain
Uses a quick sharp-then-flat-then-sharp-again DFG envelope to try to emulate the "snatch" of the pick against the string.

TULL - Mirage Tull Flute Attack, Tull Sustain
The original sample was an over-blown flute with a lot of noise components. This is the best I can do with the derived harmonics but it is a pale reflection of the original.

E VOCALS - ESQ 47 Voice 1c, ESQ 48 Voice 1d, ESQ 45 Voice 1a
Vocals are very range-specific, and sound unnatural out of a very narrow range. The ESQ waves used in this patch have different harmonic contents, and I was hoping to get a "vowel shift" by modulating the components at different rates. The ESQ vocal waves actually do better in a multi assigned to their natural ranges, as illustrated in Wavelib 5 and Wavelib 7.

CP70 patches - autoassigned between complementary pairs of Mirage multi-samples of CP 70 attacks and sustains.

Uses short attacks on envelope 3 on manually-added odd harmonics to make a hammer thock. Uses DDF envelope and DDF keyscaling to smooth response, and DDA rate scaling to make patches decay quicker in the upper ranges of the keyboard. The multi "CP70" splits these across the keyboard as they were in the original multi-sample. This is my last attempt to get a realistic acoustic piano out of the K5. The multi patch sounds pretty good, considering. It is still a little too bright, although it is already filtered quite a bit. Perhaps the DFT would be a good way to rectify this.

WAVELIB1

	SINGLE A	SINGLE B	SINGLE C	SINGLE D
1	K14-SAW1	K26SAW13	K38INSAW	K50CLAVI
2	K15-SAW2	K27SAW14	K39-TRI	K51VIBE
3	K16-SAW3	K28SAW15	K40-RND	K52AGUIT
4	K17-SAW4	K29SAW16	K41FRHRN	K53FGUIT
5	K18-SAW5	K30SAW17	K42STRNG	K54FGUIT
6	K19-SAW6	K31SAW18	K43STRNG	K55ACBAS
7	K20-SAW7	K32SAW19	K44STPAD	K56ACBAS
8	K21-SAW8	K33-SQR1	K45PNO1	K57DGBAS
9	K22-SAW9	K34-SQR2	K46ELGRD	K58PKBAS
10	K23SAW10	K35-SQR3	K47EPNO1	K59DGBS2
11	K24SAW11	K36-SQR4	K48EPNO2	K60RNBAS
12	K25SAW12	K37-SQR5	K49EPNO3	K61FRTLS

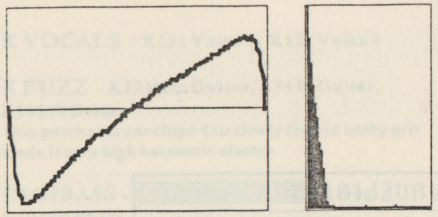
K1 Saw waves are all variations on the harmonic content of the basic Sawtooth waveform. It can be argued that the sawtooth is the most useful wave for subtractive synthesis (using a filter to "carve out" a sound). In analog synthesizers the saw is the basis for string, horn, and many of the most useful lead tones.

K1 Square waves are various equalizations of the square. Square waves have a "hollow" or "woody" tone and are most useful for woodwinds, certain organ tones, and mellow synth leads.

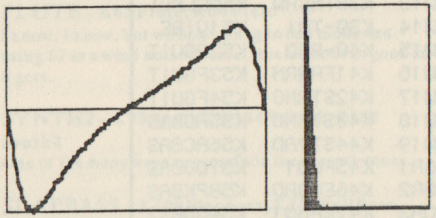
The balance of the waves in this bank are with reduced high-frequency content, such as would be found in the decay or sustain portion of a sample.

K1 waves 1 through 13 are merely single harmonics, and were not included here since these are always available on the K5.

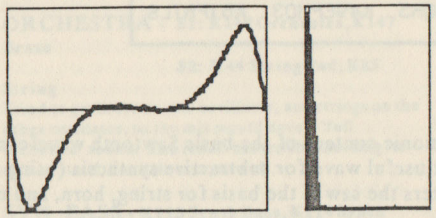
K1 Wave 14 - Saw 1



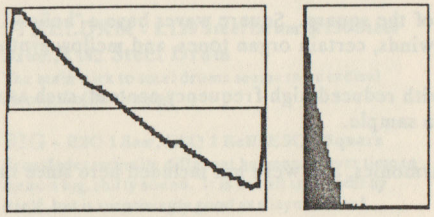
K1 Wave 15 - Saw 2



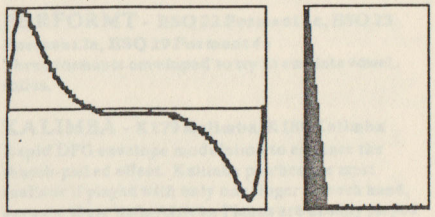
K1 Wave 16 - Saw 3



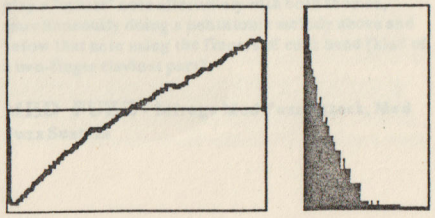
K1 Wave 17 - Saw 4



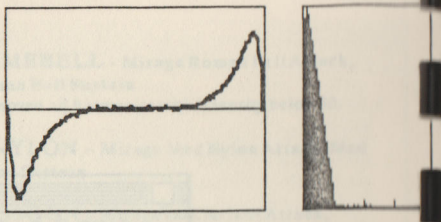
K1 Wave 18 - Saw 5



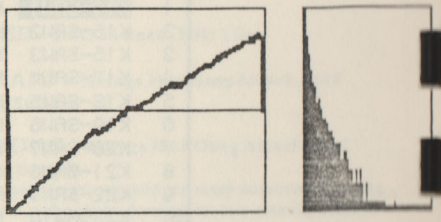
K1 Wave 19 - Saw 6



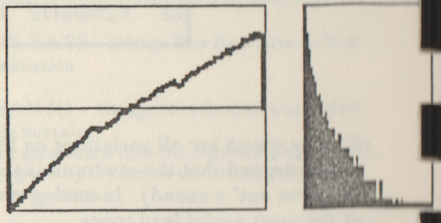
K1 Wave 20 - Saw 7



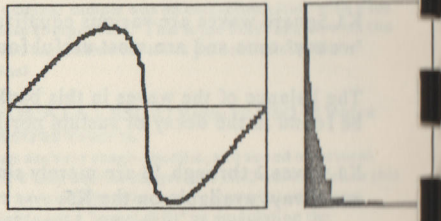
K1 Wave 21 - Saw 8



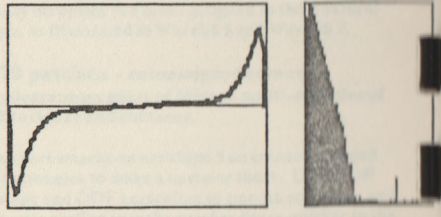
K1 Wave 22 - Saw 9



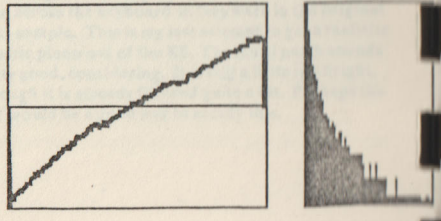
K1 Wave 23 - Saw 10



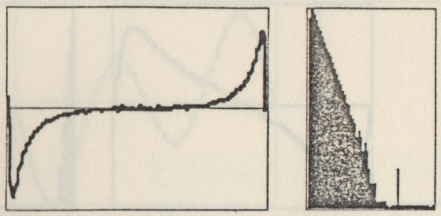
K1 Wave 24 - Saw 11



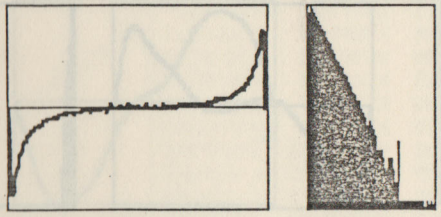
K1 Wave 25 - Saw 12



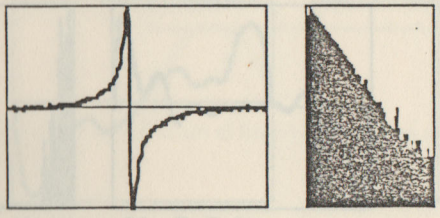
K1 Wave 26 - Saw 13



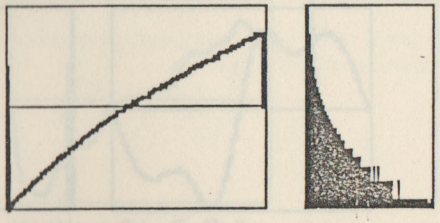
K1 Wave 27 - Saw 14



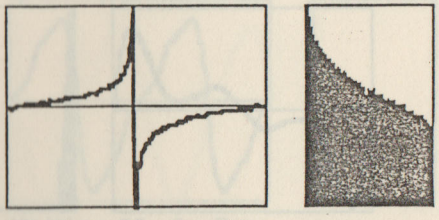
K1 Wave 28 - Saw 15



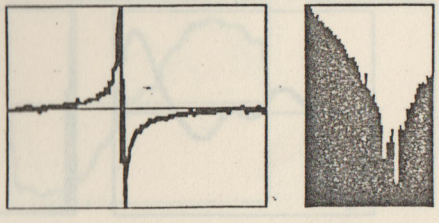
K1 Wave 29 - Saw 16



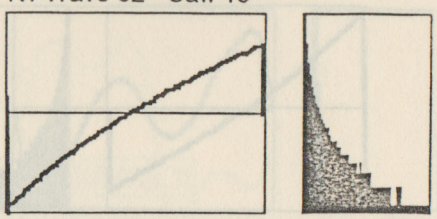
K1 Wave 30 - Saw 17



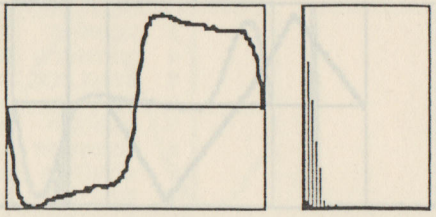
K1 Wave 31 - Saw 18



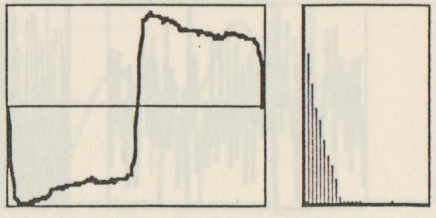
K1 Wave 32 - Saw 19



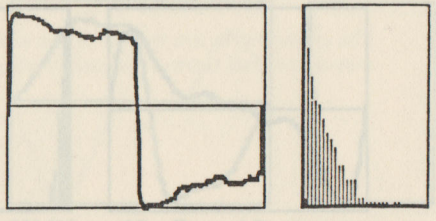
K1 Wave 33 - Square 1



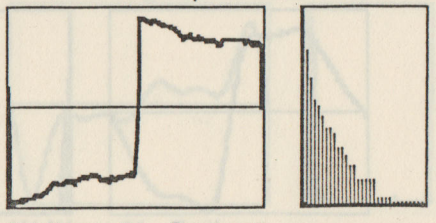
K1 Wave 34 - Square 2



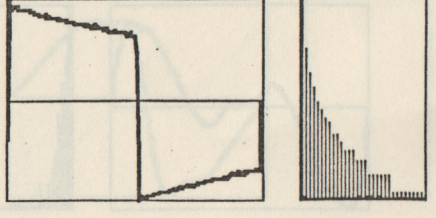
K1 Wave 35 - Square 3



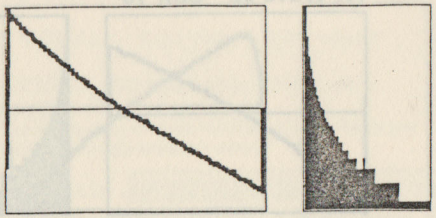
K1 Wave 36 - Square 4



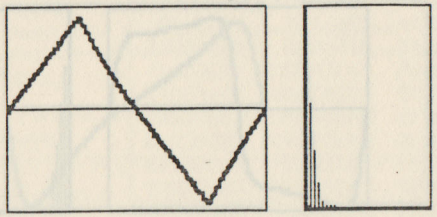
K1 Wave 37 - Square 5



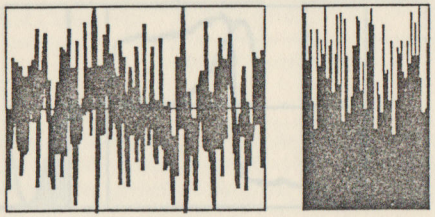
K1 Wave 38 - Inverse Saw



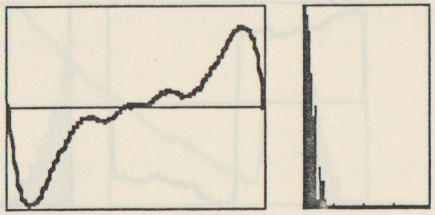
K1 Wave 39 - Triangle



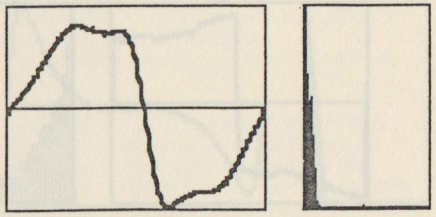
K1 Wave 40 - Random



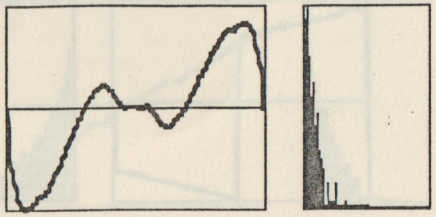
K1 Wave 41 - French Horn



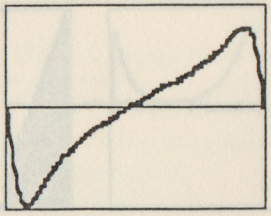
K1 Wave 42 - String



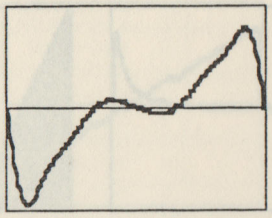
K1 Wave 43 - String



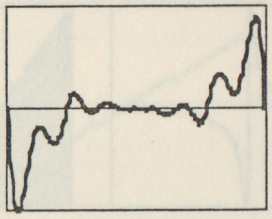
K1 Wave 44 - String Pad



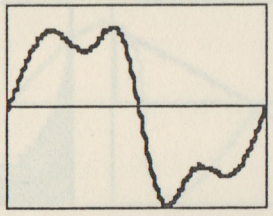
K1 Wave 45 - Piano 1



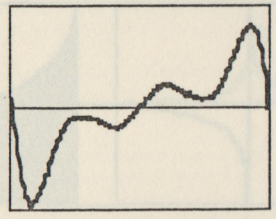
K1 Wave 46 - El. Grand



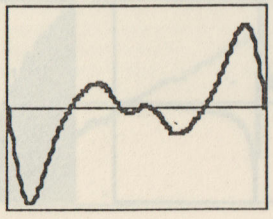
K1 Wave 47 - E. Piano 1



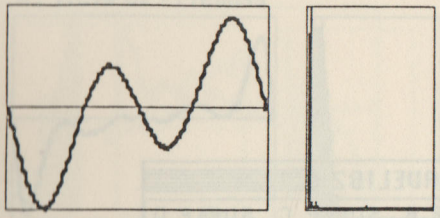
K1 Wave 48 - E. Piano 2



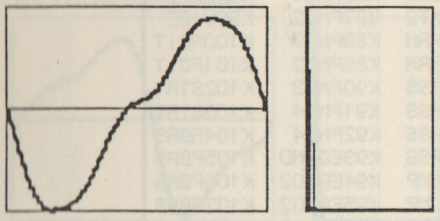
K1 Wave 49 - E. Piano 3



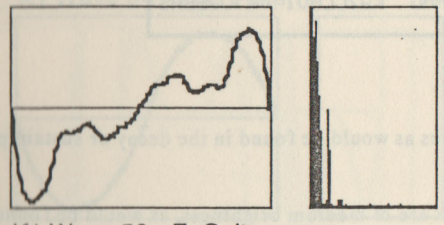
K1 Wave 50 - Clavi



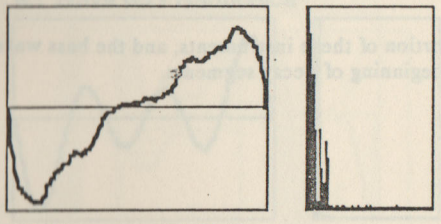
K1 Wave 51 - Vibe



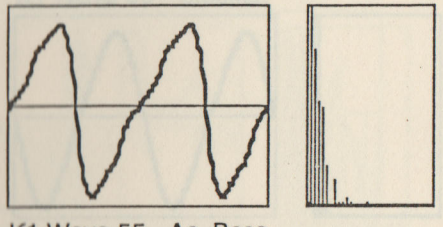
K1 Wave 52 - A. Guitar



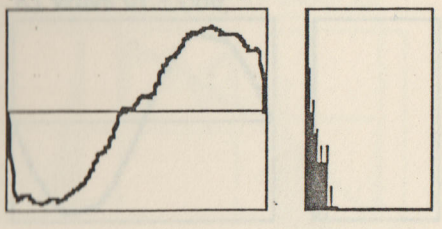
K1 Wave 53 - F. Guitar



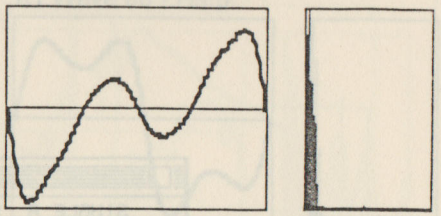
K1 Wave 54 - F. Guitar



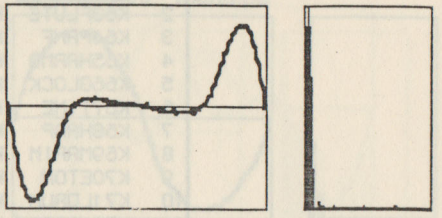
K1 Wave 55 - Ac. Bass



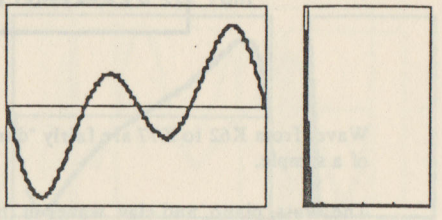
K1 Wave 56 - Ac. Bass



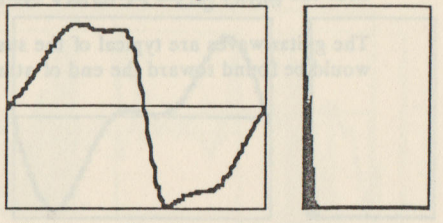
K1 Wave 57 - Digi Bass



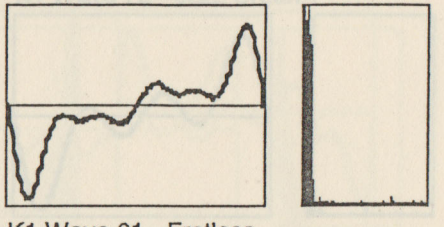
K1 Wave 58 - Pick Bass



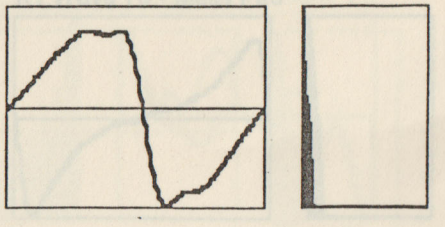
K1 Wave 59 - Digi Bass 2



K1 Wave 60 - Round Bass



K1 Wave 61 - Fretless



WAVELIB2

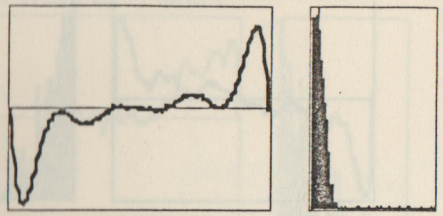
	SINGLE A	SINGLE B	SINGLE C	SINGLE D
1	K62FRETL	K74SYSOL	K86PN01	K98HRPSI
2	K63FLUTE	K75SYNT2	K87PN02	K99VIBE
3	K64PANF	K76FRHRN	K88PN03	K100AGIT
4	K65HARMO	K77FRHRN	K89PN02	K101FGIT
5	K66GLOCK	K78BRASS	K90PN03	K102STRT
6	K67TINE	K79BRASS	K91PN04	K103STRT
7	K68HARP	K80BRASS	K92PN04	K104ABAS
8	K69MARIM	K81BRASS	K93EGRND	K105PBAS
9	K70ETOM	K82TRUMP	K94EPN02	K106PBAS
10	K71LDRUM	K83TRUMP	K95EPN02	K107RBAS
11	K72JORG1	K84VIOLN	K96EPN02	K108SBAS
12	K73MLPAD	K85STRNG	K97CLAVI	K109SBAS

Waves from K62 to K77 are fairly "dark" waves as would be found in the decay or sustain part of a sample.

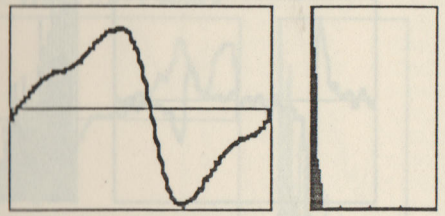
The brass, piano, and clav waves in this bank are of medium brightness, as would be found near the middle of the decay of a sample.

The guitar waves are typical of the sustain portion of these instruments, and the bass waves would be found toward the end of attack or beginning of decay segments.

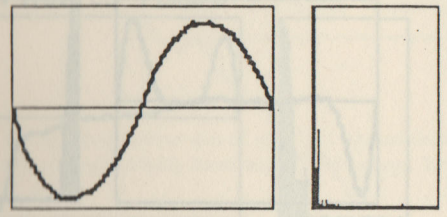
K1 Wave 62 - Fretless



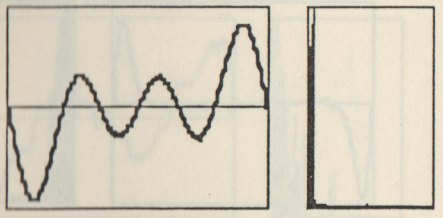
K1 Wave 63 - Flute



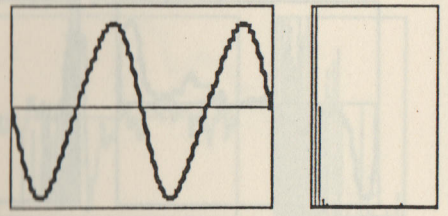
K1 Wave 64 - Pan Flute



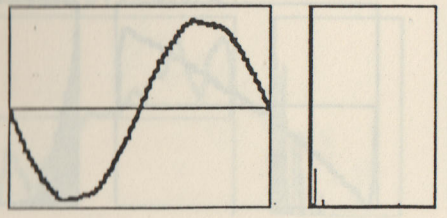
K1 Wave 65 - Harmonica



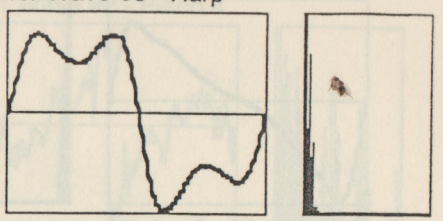
K1 Wave 66 - Glocken



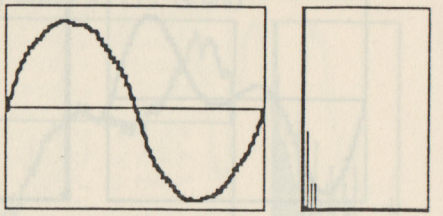
K1 Wave 67 - Tine



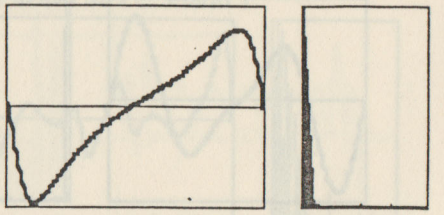
K1 Wave 68 - Harp



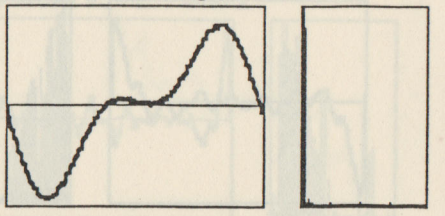
K1 Wave 69 - Marimba



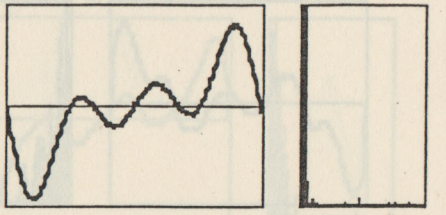
K1 Wave 70 - E. Tom



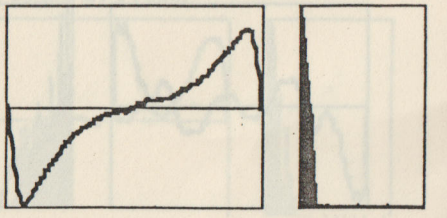
K1 Wave 71 - Log Drum



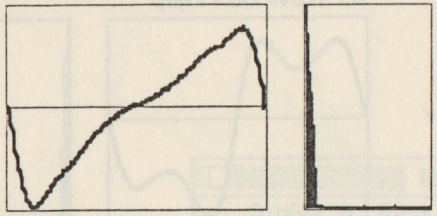
K1 Wave 72 - Jazz Organ 1



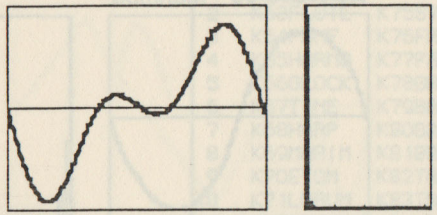
K1 Wave 73 - Mello Pad



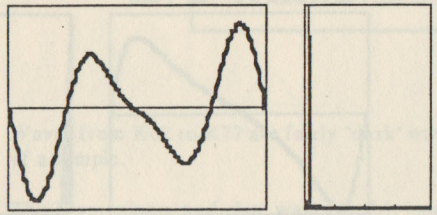
K1 Wave 74 - Synth Solo



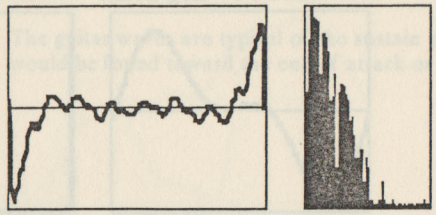
K1 Wave 75 - Synth 2



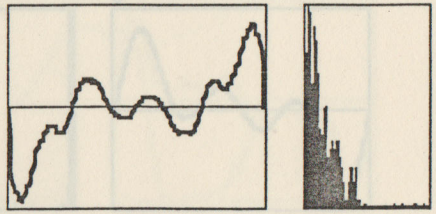
K1 Wave 76 - French Horn



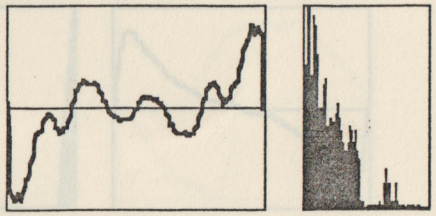
K1 Wave 77 - French Horn



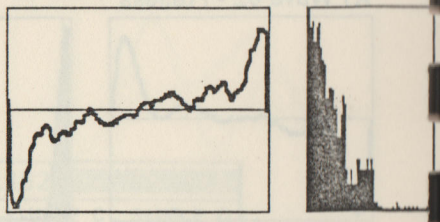
K1 Wave 78 - Brass



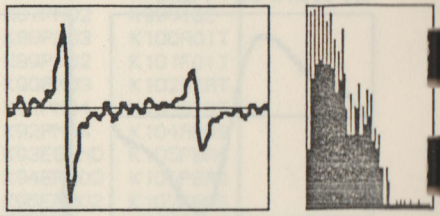
K1 Wave 79 - Brass



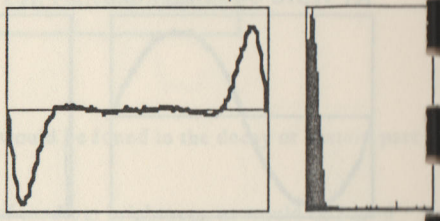
K1 Wave 80 - Brass



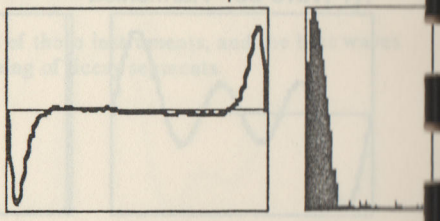
K1 Wave 81 - Brass



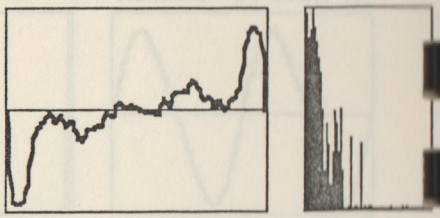
K1 Wave 82 - Trumpet



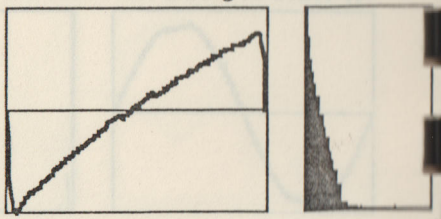
K1 Wave 83 - Trumpet



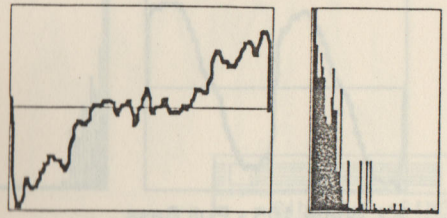
K1 Wave 84 - Violin



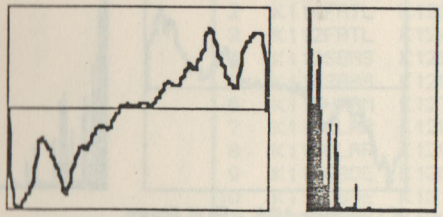
K1 Wave 85 - String



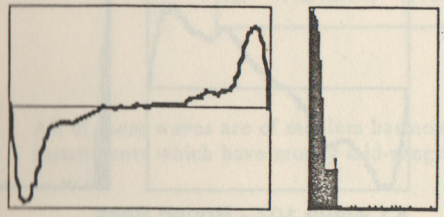
K1 Wave 86 - Piano 1



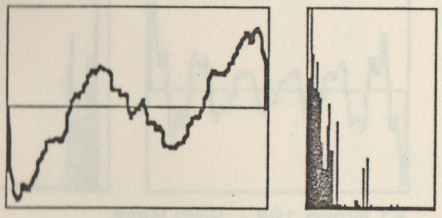
K1 Wave 87 - Piano 2



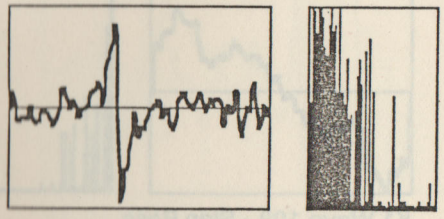
K1 Wave 88 - Piano 3



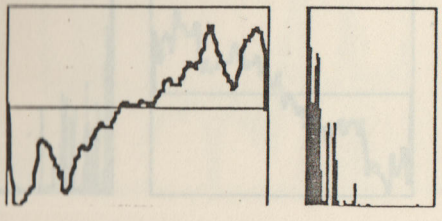
K1 Wave 89 - Piano 2



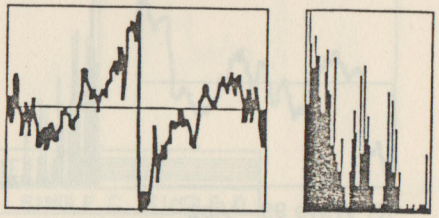
K1 Wave 90 - Piano 3



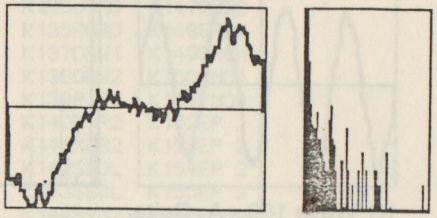
K1 Wave 91 - Piano 4



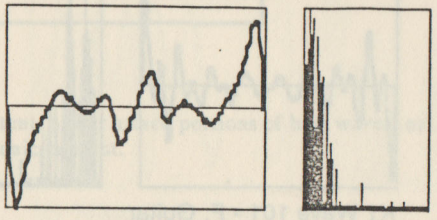
K1 Wave 92 - Piano 4



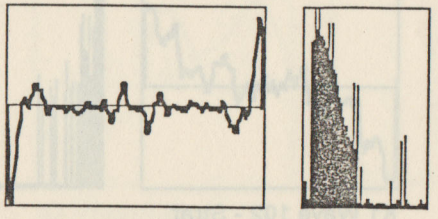
K1 Wave 93 - El. Grand



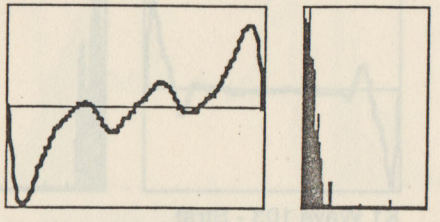
K1 Wave 94 - E. Piano 1



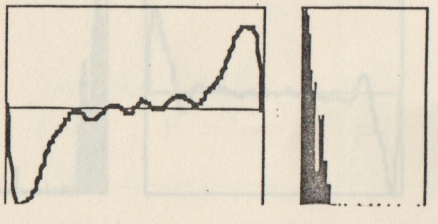
K1 Wave 95 - E. Piano 2



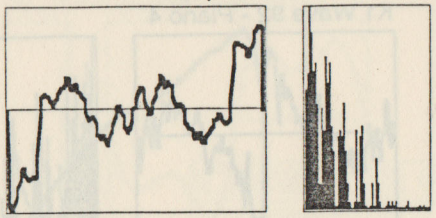
K1 Wave 96 - E. Piano 2



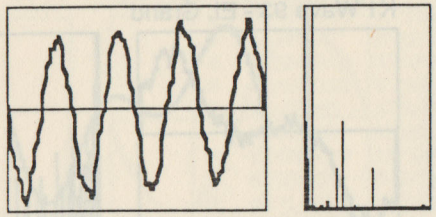
K1 Wave 97 - Clavi



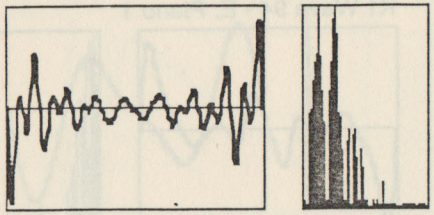
K1 Wave 98 - Harpsichord



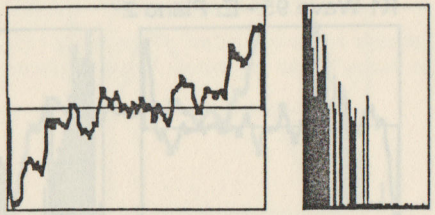
K1 Wave 99 - Vibe



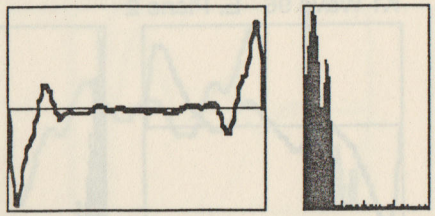
K1 Wave 100 - A. Guitar



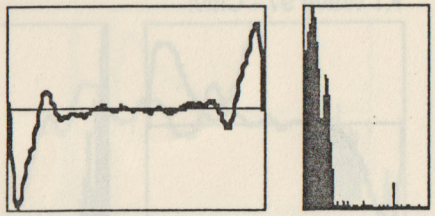
K1 Wave 101 - F. Guitar



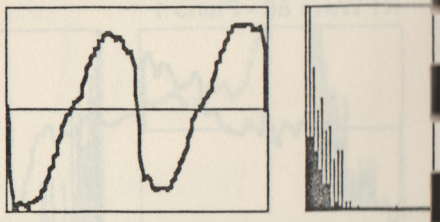
K1 Wave 102 - Strat



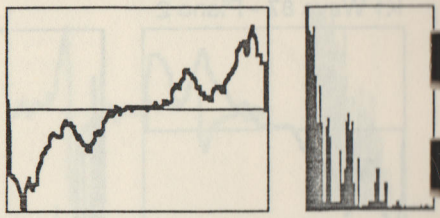
K1 Wave 103 - Strat



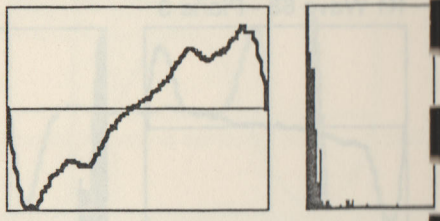
K1 Wave 104 - Ac. Bass



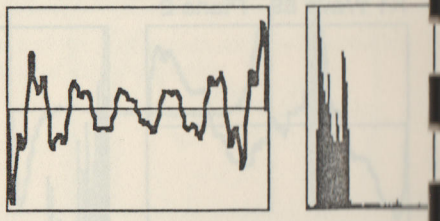
K1 Wave 105 - Pull Bass



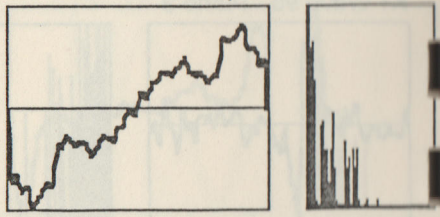
K1 Wave 106 - Pull Bass



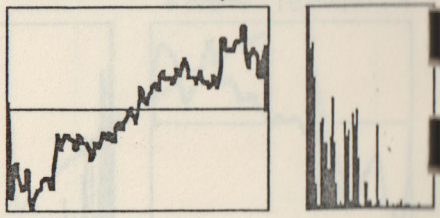
K1 Wave 107 - Round Bass



K1 Wave 108 - Slap Bass



K1 Wave 109 - Slap Bass

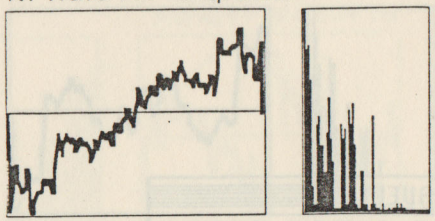


WAVELIB3

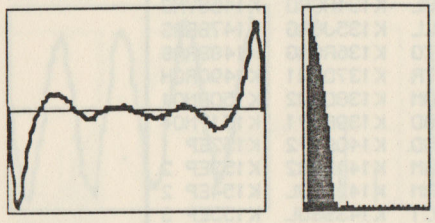
	SINGLE A	SINGLE B	SINGLE C	SINGLE D
1	K110SBAS	K122ORBL	K134ACRD	K146SYN3
2	K111FRTL	K123BELL	K135JORG	K147BRAS
3	K112FRTL	K124KOTO	K136RORG	K148BRAS
4	K113SBAS	K125SITR	K137DRW1	K149ORCH
5	K114SBAS	K126KTOM	K138DRW2	K150PN01
6	K115HARM	K127LOGD	K139PIP1	K151PN04
7	K116CLAR	K128LOGD.	K140PIP2	K152EP 1
8	K117CLAR	K129SDRM	K141ROR2	K153EP 2
9	K118OBOE	K130SDRM	K142SSOL	K154EP 2
10	K119OBOE	K131VOC1	K143SSOL	K155EP 3
11	K120SHAK	K132VOC2	K144SYN2	K156CLAV
12	K121ORBL	K133ACRD	K145SYN2	K157HRPS

All of these waves are of medium harmonic content, either attack portions of bass waves, or instruments which have mostly mid-range harmonic content.

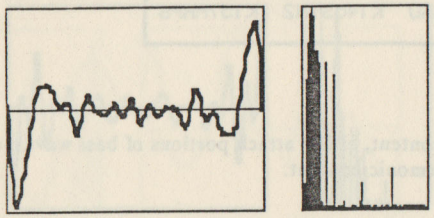
K1 Wave 110 - Slap Bass



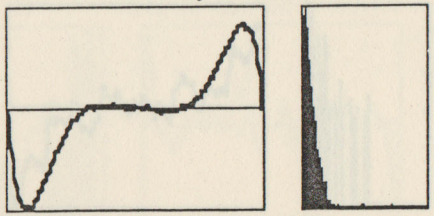
K1 Wave 111 - Fretless



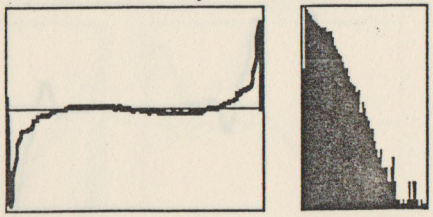
K1 Wave 112 - Fretless



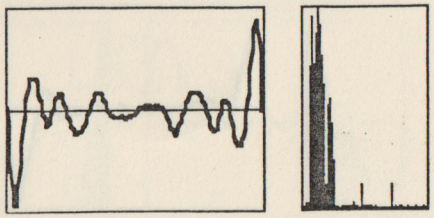
K1 Wave 113 - Synth Bass



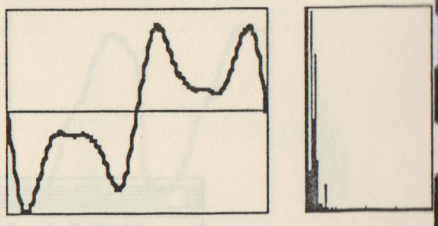
K1 Wave 114 - Synth Bass



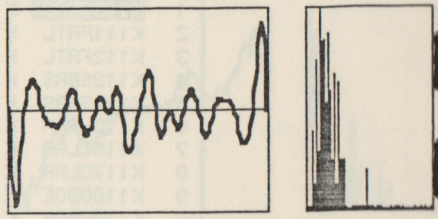
K1 Wave 115 - Harmonica



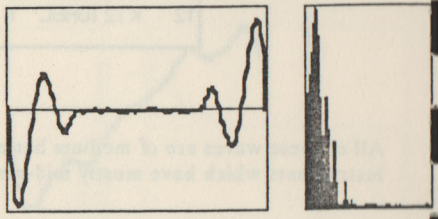
K1 Wave 116 - Clarinet



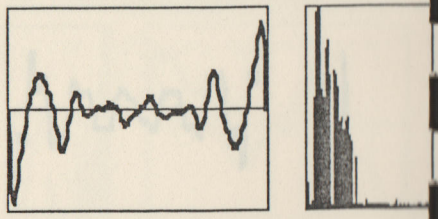
K1 Wave 117 - Clarinet



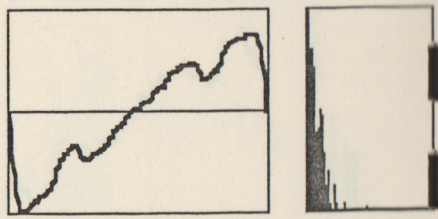
K1 Wave 118 - Oboe



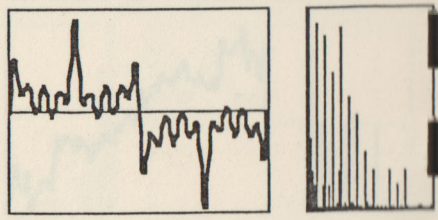
K1 Wave 119 - Oboe



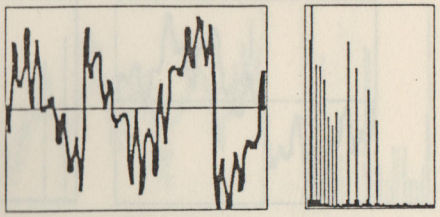
K1 Wave 120 - Shakuhachi



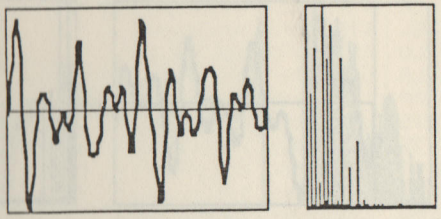
K1 Wave 121 - Orient Bell



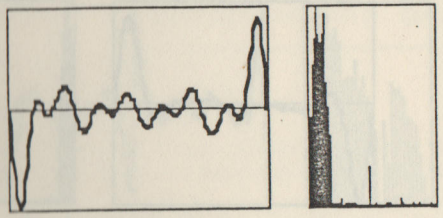
K1 Wave 122 - Orient Bell



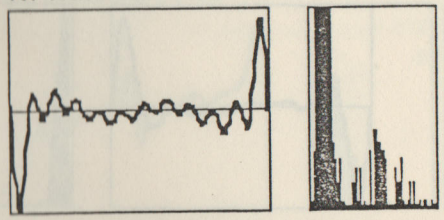
K1 Wave 123 - Bell



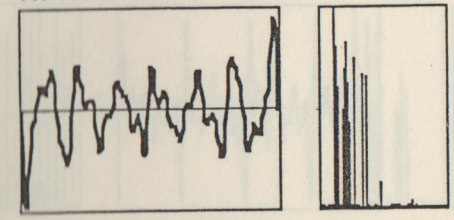
K1 Wave 124 - Koto



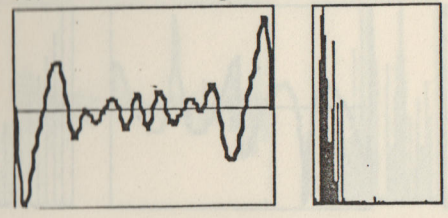
K1 Wave 125 - Sitar



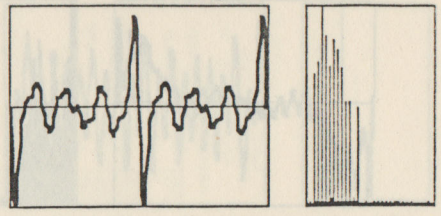
K1 Wave 126 - K. Tom



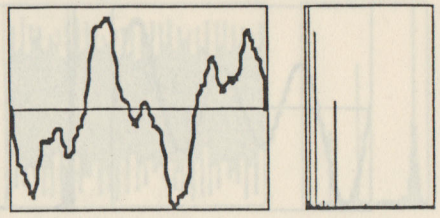
K1 Wave 127 - Log Drum



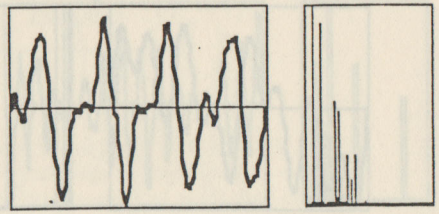
K1 Wave 128 - Log Drum



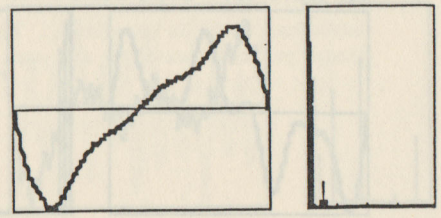
K1 Wave 129 - Steel Drum



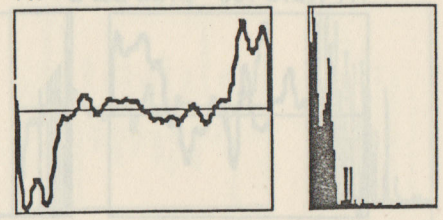
K1 Wave 130 - Steel Drum



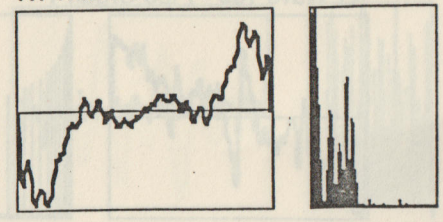
K1 Wave 131 - Voice 1



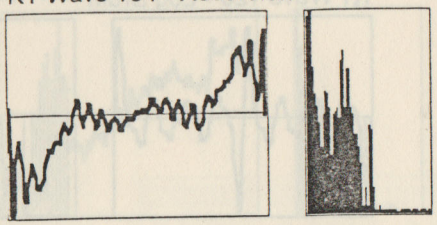
K1 Wave 132 - Voice 2



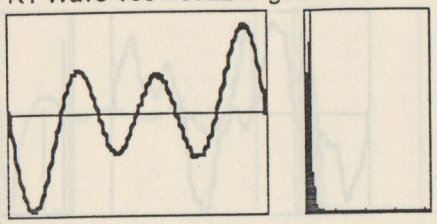
K1 Wave 133 - Accordion



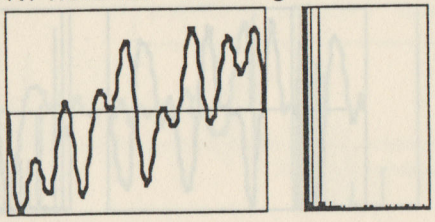
K1 Wave 134 - Accordion



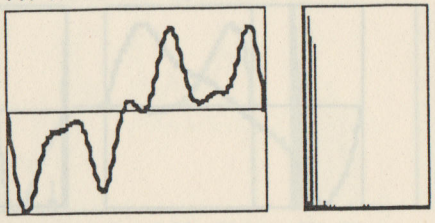
K1 Wave 135 - Jazz Organ



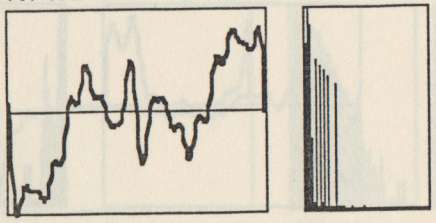
K1 Wave 136 - Rock Organ



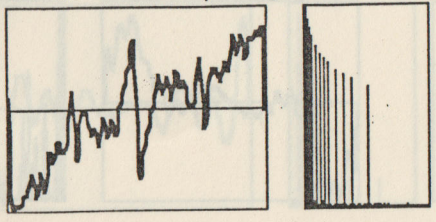
K1 Wave 137 - Draw Bar 1



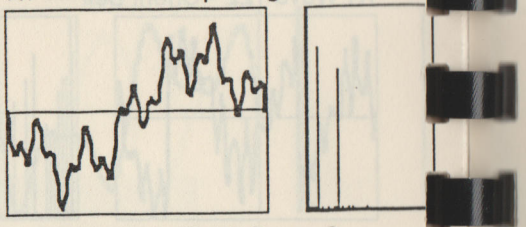
K1 Wave 138 - Draw Bar 2



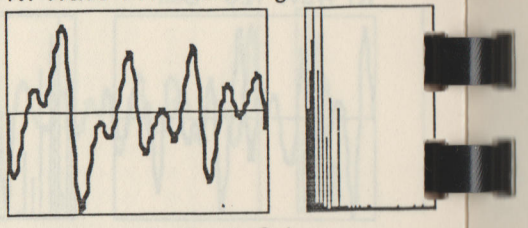
K1 Wave 139 - Pipe Organ 1



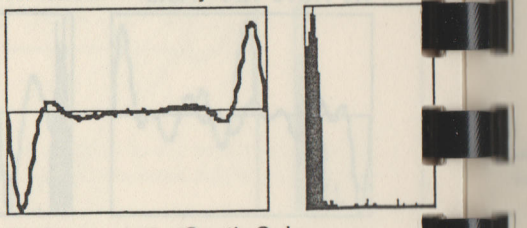
K1 Wave 140 - Pipe Organ 2



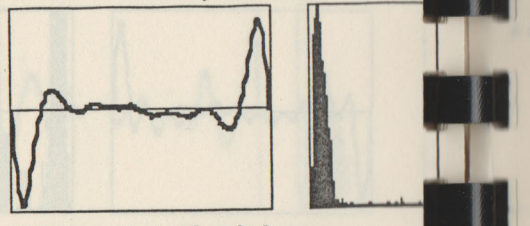
K1 Wave 141 - Rock Organ 2



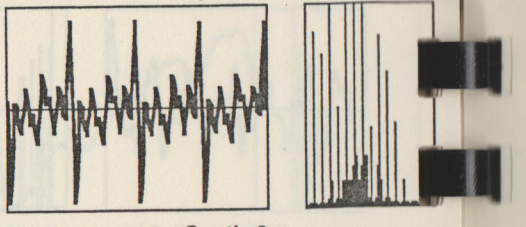
K1 Wave 142 - Synth Solo



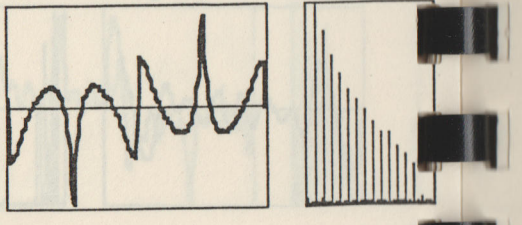
K1 Wave 143 - Synth Solo



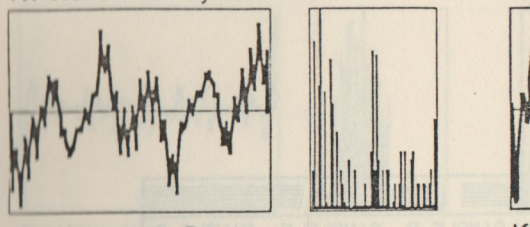
K1 Wave 144 - Synth 2



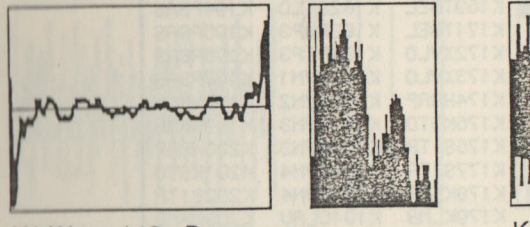
K1 Wave 145 - Synth 2



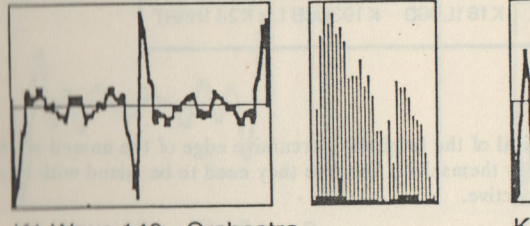
K1 Wave 146 - Synth 3



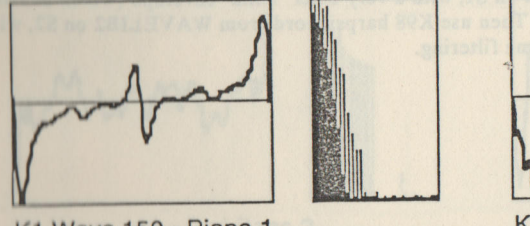
K1 Wave 147 - Brass



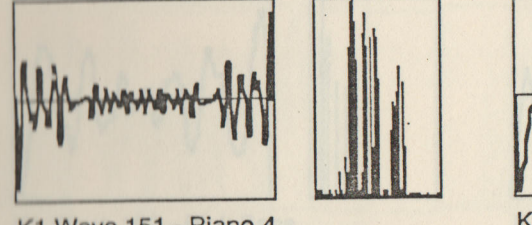
K1 Wave 148 - Brass



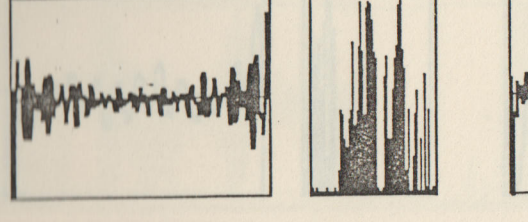
K1 Wave 149 - Orchestra



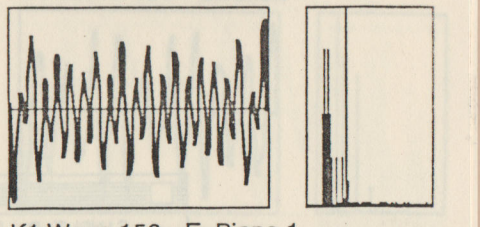
K1 Wave 150 - Piano 1



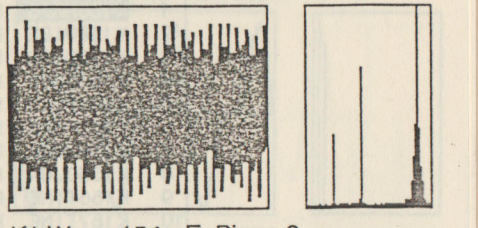
K1 Wave 151 - Piano 4



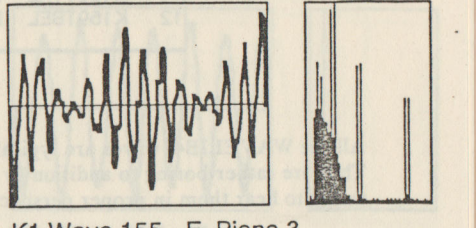
K1 Wave 152 - E Piano 1



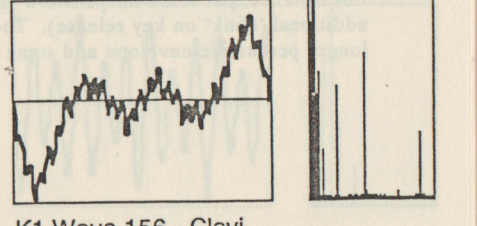
K1 Wave 153 - E. Piano 1



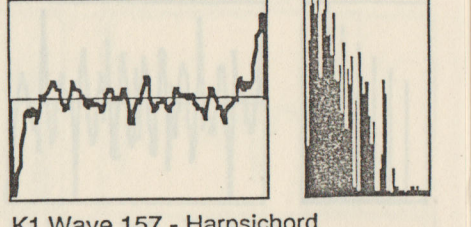
K1 Wave 154 - E. Piano 2



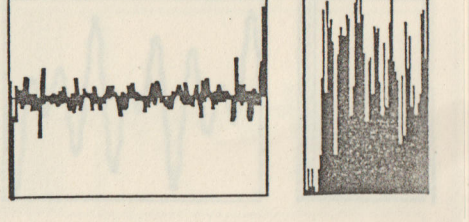
K1 Wave 155 - E. Piano 3



K1 Wave 156 - Clavi



K1 Wave 157 - Harpsichord



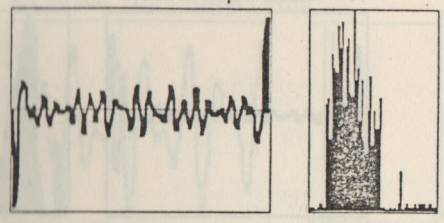
WAVELIB4

	SINGLE A	SINGLE B	SINGLE C	SINGLE D
1	K158HRPS	K169TBEL	K182STLD	K194PBAS
2	K150VIBE	K171TBEL	K183PIP3	K195PBAS
3	K160DGBS	K172XYLO	K184PIP3	K196RBAS
4	K161DGB2	K173XYLO	K185SYN1	K197RBAS
5	K162DGB2	K174HARP	K186SYN2	K198HRMN
6	K163PBAS	K176KOTO	K187SYN3	K199HRMN
7	K164GLOK	K176SITR	K188SYN3	K200HARP
8	K165GLOK	K177SITR	K189SYN4	K201KOTO
9	K166TINE	K178KLMB	K190SYN4	K202SITR
10	K167TINE	K179KLMB	K191CLAV	K203MRMB
11	K168TINE	K180KLMB	K192DGB1	K204SYN1
12	K169TBEL	K181LOGD	K193DGB1	K211HHAT

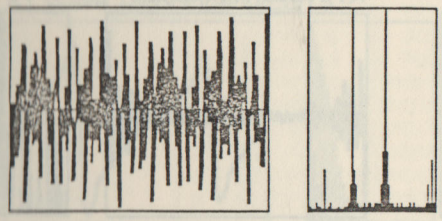
All the WAVELIB4 waves are typical of the brightest percussive edge of the named sounds. They are rather boring to audition by themselves, because they need to be mixed with darker waves to hear them in proper perspective.

For instance, put K158 harpsichord on S1, with a very brief "clink" envelope (which has an additional "clink" on key release). Then use K98 harpsichord from WAVELIB2 on S2, with a longer percussive envelope and some filtering.

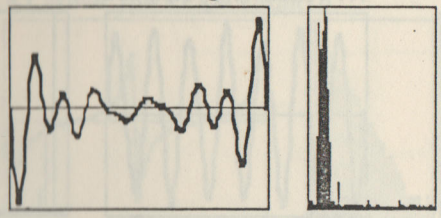
K1 Wave 158 - Harpsichord



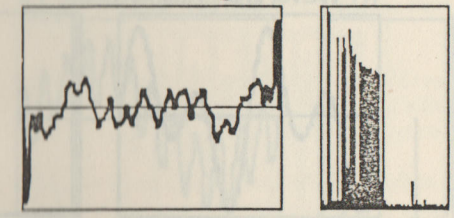
K1 Wave 159 - Vibe



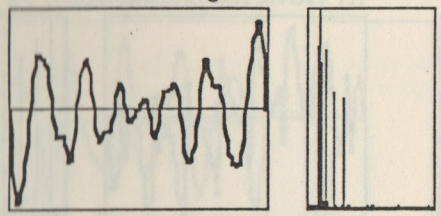
K1 Wave 160 - Digi Bass 1



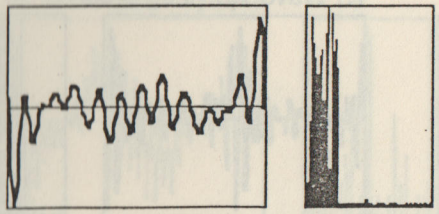
K1 Wave 161 - Digi Bass 2



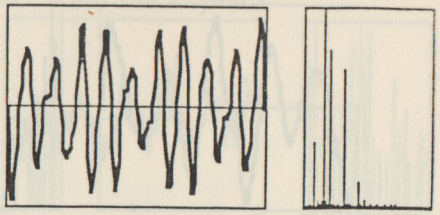
K1 Wave 162 - Digi Bass 2



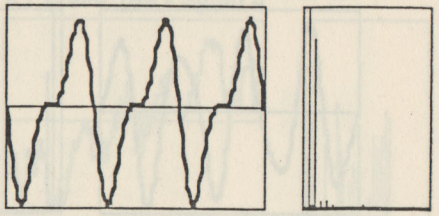
K1 Wave 163 - Pick Bass



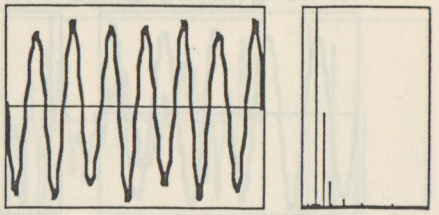
K1 Wave 164 - Glocken



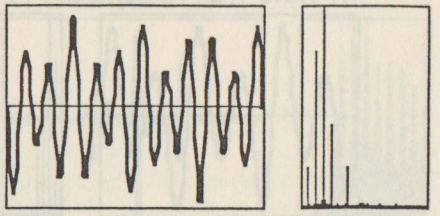
K1 Wave 165 - Glocken



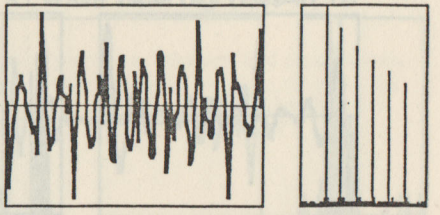
K1 Wave 166 - Tine



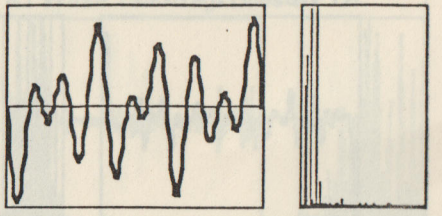
K1 Wave 167 - Tine



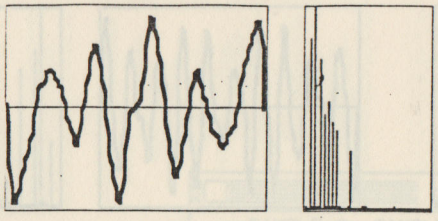
K1 Wave 168 - Tine



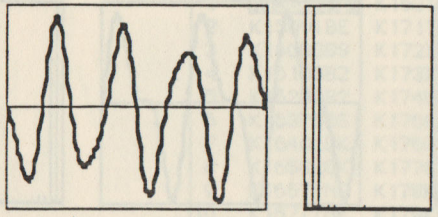
K1 Wave 169 - Tube Bell



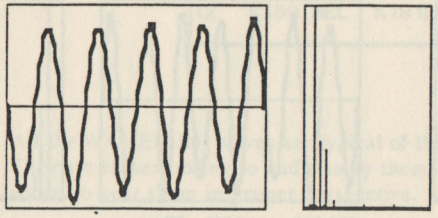
K1 Wave 170 - Tube Bell



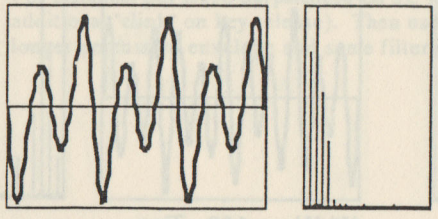
K1 Wave 171 - Tube Bell



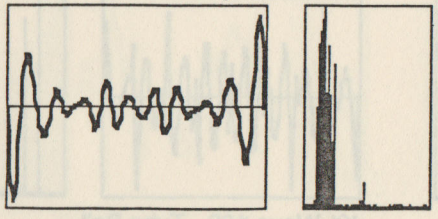
K1 Wave 172 - Xylophone



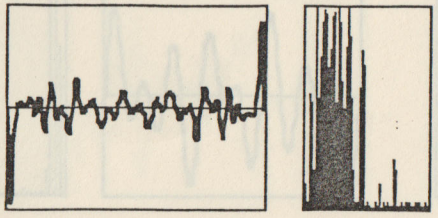
K1 Wave 173 - Xylophone



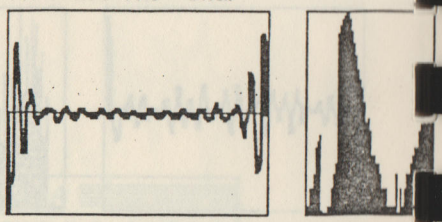
K1 Wave 174 - Harp



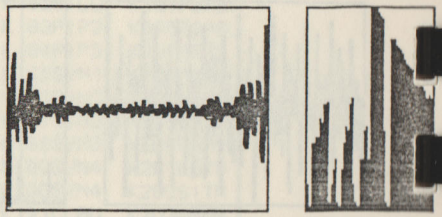
K1 Wave 175 - Koto



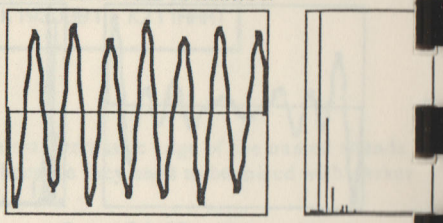
K1 Wave 176 - Sitar



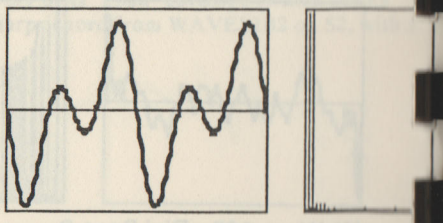
K1 Wave 177 - Sitar



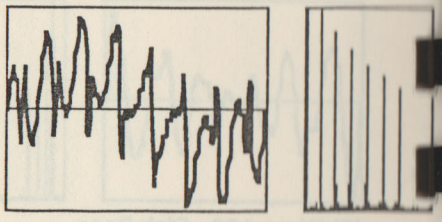
K1 Wave 178 - Kalimba



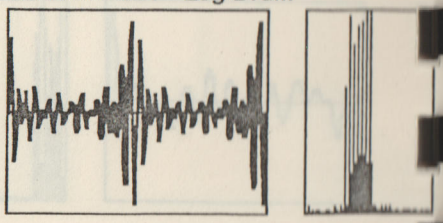
K1 Wave 179 - Kalimba



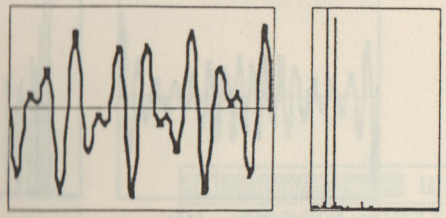
K1 Wave 180 - Kalimba



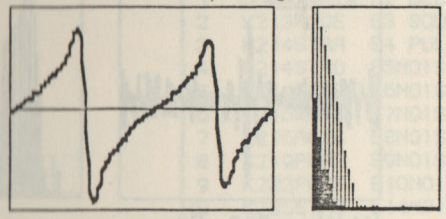
K1 Wave 181 - Log Drum



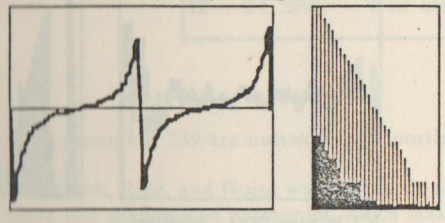
K1 Wave 182 - Steel Drum



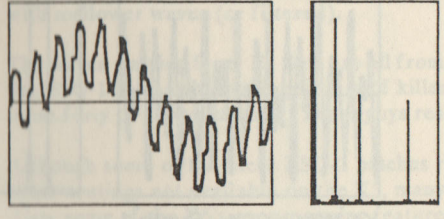
K1 Wave 183 - Pipe Organ 3



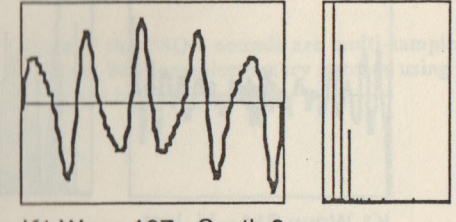
K1 Wave 184 - Pipe Organ 3



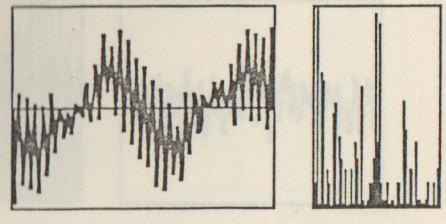
K1 Wave 185 - Synth 1



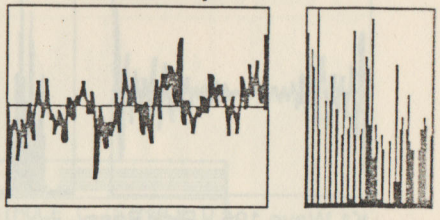
K1 Wave 186 - Synth 2



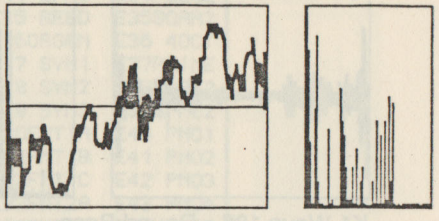
K1 Wave 187 - Synth 3



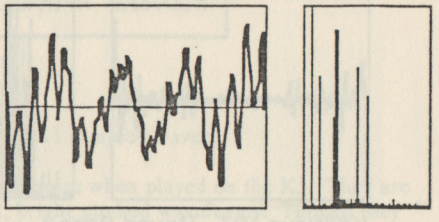
K1 Wave 188 - Synth 3



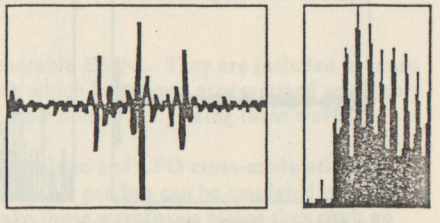
K1 Wave 189 - Synth 4



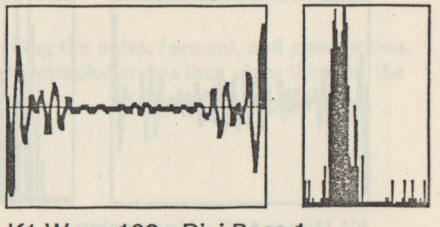
K1 Wave 190 - Synth 4



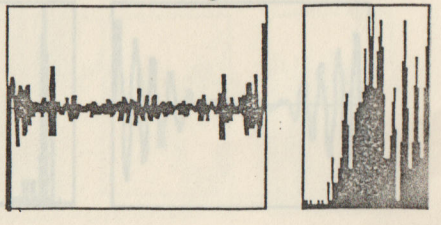
K1 Wave 191 - Clavi



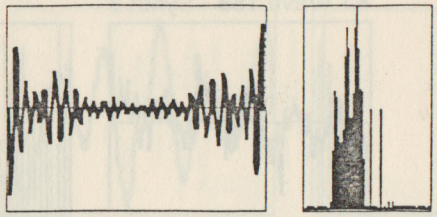
K1 Wave 192 - Digi Bass 1



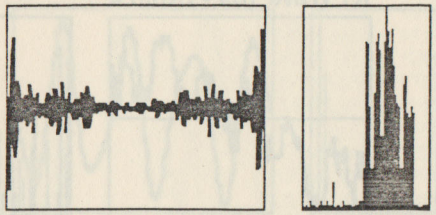
K1 Wave 193 - Digi Bass 1



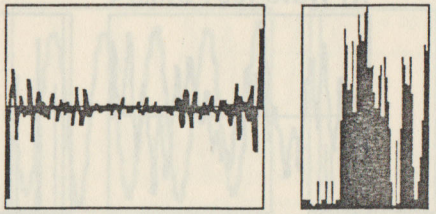
K1 Wave 194 - Pick Bass



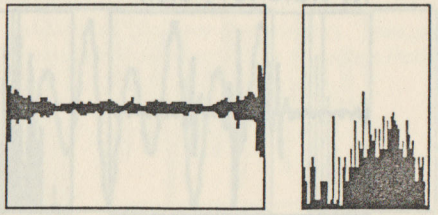
K1 Wave 195 - Pick Bass



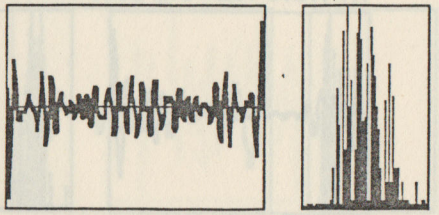
K1 Wave 196 - Round Bass



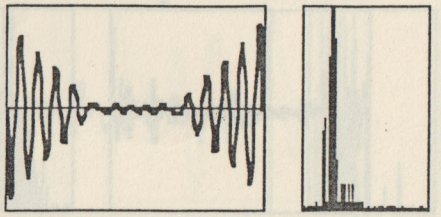
K1 Wave 197 - Round Bass



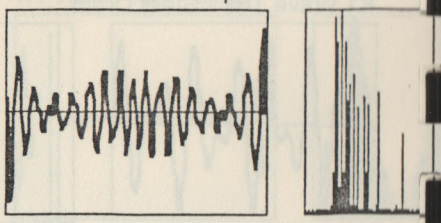
K1 Wave 198 - Harmonica



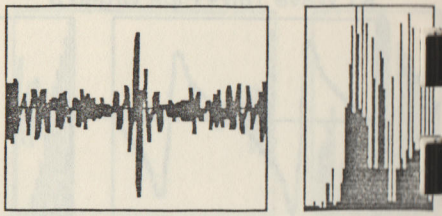
K1 Wave 199 - Harmonica



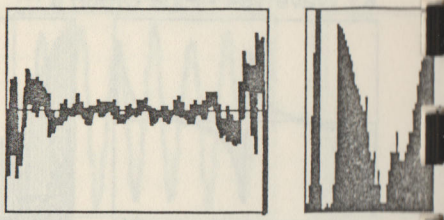
K1 Wave 200 - Harp



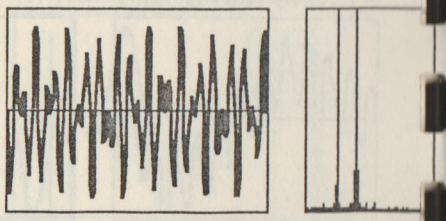
K1 Wave 201 - Koto



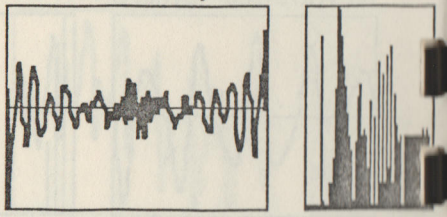
K1 Wave 202 - Sitar



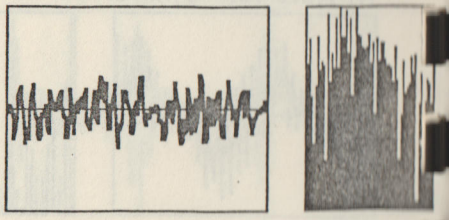
K1 Wave 203 - Marimba



K1 Wave 204 - Synth 1



K1 Wave 211 - H. Hat



WAVELIB5

	SINGLE A	SINGLE B	SINGLE C	SINGLE D
1	K212CRSH	E2 BELL	E14 EPNO	E34PULS2
2	K213RIDE	E3 SQUAR	E15 REED	E35SQAR2
3	K214STRA	E4 PULSE	E16ORGAN	E36 4OCT
4	K214STRD	E5NOIS1A	E17 SYN1	E37PRIME
5	K214STRS	E6NOIS1B	E18 SYN2	E38BASS2
6	K216AGTA	E7NOIS1C	E19 SYN3	E39EPNO2
7	K216AGTS	E8NOIS2A	E20FMT1A	E40 PNO1
8	K219PBAS	E9NOIS2B	E21FMT1B	E41 PNO2
9	K232PANF	E10NOI2C	E22FMT1C	E42 PNO3
10	K235STRG	E11NOI3A	E23FMT2A	E43 PNO4
11	K239NOIS	E12NOI3B	E24FMT2C	E44 PNO5
12	E1 SAW	E13 BASS	E29FMT4A	E45VOC1A

K212 through K 239 are outtakes from portions of the K1 sampled waves.

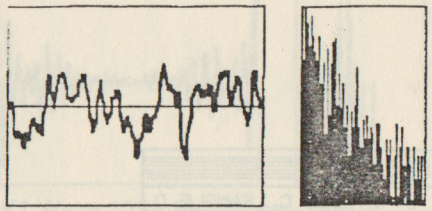
The Crash, Ride, and Noise waveforms do sound like noise when played on the K5. They are more like randomized harmonics, which makes odd, bright pitched waveforms. Though they do not work as noise, they can work for Fuzz leads, clavinets, and attack partials when mixed with mellower waves (or filtered).

The waves starting from E1 Saw are all from the venerable ESQ-1. They are included because the ESQ-1 has an astounding library of killer patches which have been programmed using only these forty or so waveforms. Those guys really did their homework picking these waves.

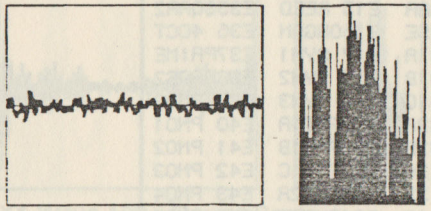
Although some of the nicer ESQ-1 patches rely on envelope and LFO cross-modulation, or other routings not available on the K5, many of the ESQ-1 patches can be emulated on the K5. Also, some of the K5's programming features can take these waveforms places they can't go on the ESQ-1.

Some of the ESQ-1 sounds are multi-sampled, including the noise, formant, and piano waves. You can built complementary patches using the multi-sampled waves then place them on the keyboard in a Multi split.

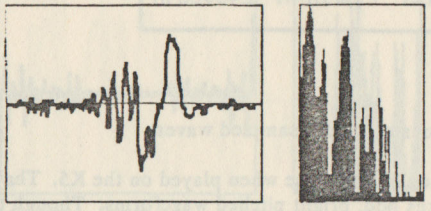
K1 Wave 212 - Crash



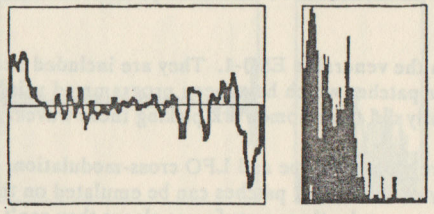
K1 Wave 213 - Ride



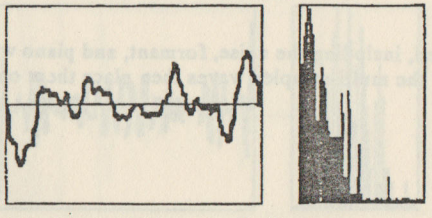
K1 Wave 214 - Strat Attack



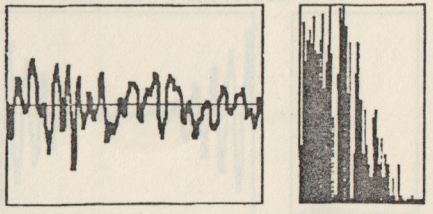
K1 Wave 214 - Strat Decay



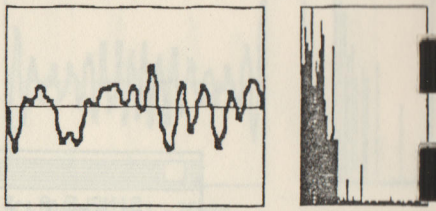
K1 Wave 214 - Strat Sustain



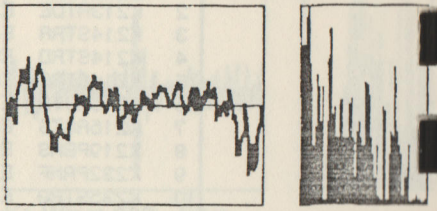
K1 Wave 216 - A. Guitar



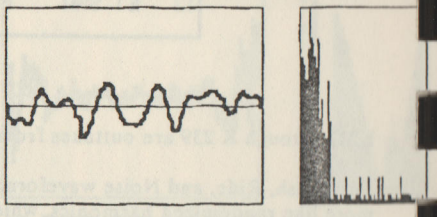
K1 Wave 216 - A. Guitar



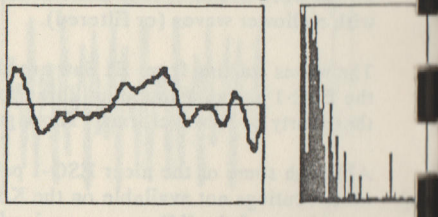
K1 Wave 219 - Pull Bass



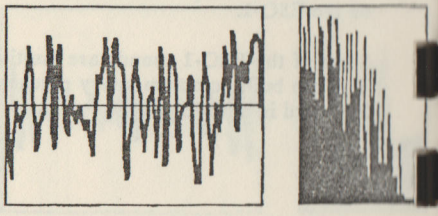
K1 Wave 232 - Pan Flute Sus



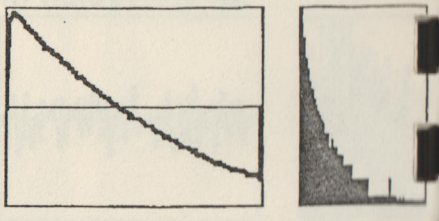
K1 Wave 235 - String Loop



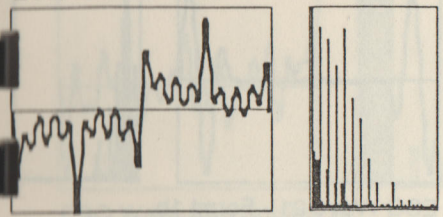
K1 Wave 239 - White Noise



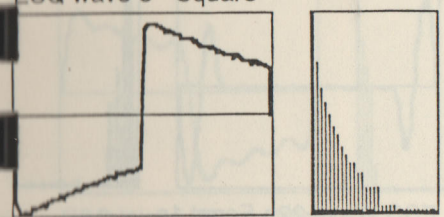
ESQ Wave 1 - Saw



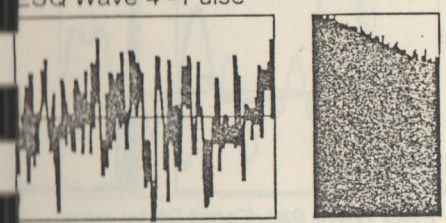
ESQ Wave 2 - Bell



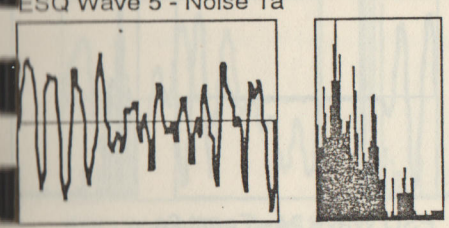
ESQ wave 3 - Square



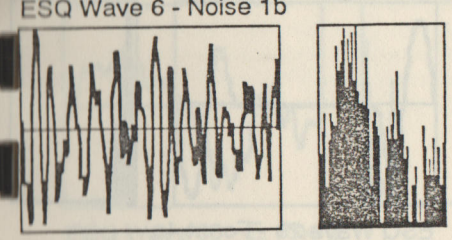
ESQ Wave 4 - Pulse



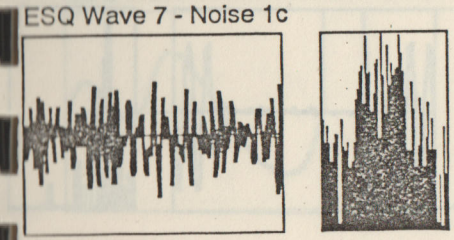
ESQ Wave 5 - Noise 1a



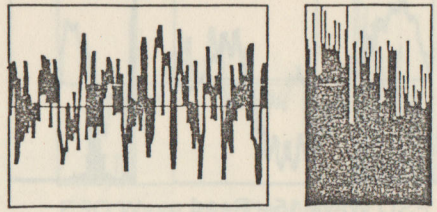
ESQ Wave 6 - Noise 1b



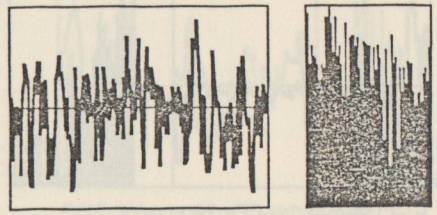
ESQ Wave 7 - Noise 1c



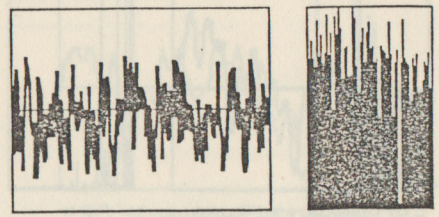
ESQ Wave 8 - Noise 2a



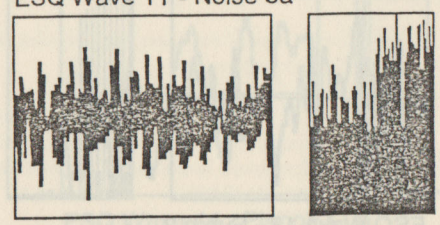
ESQ Wave 9 - Noise 2b



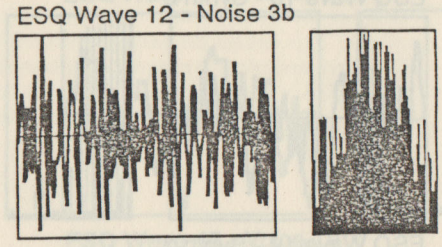
ESQ Wave 10 - Noise 2c



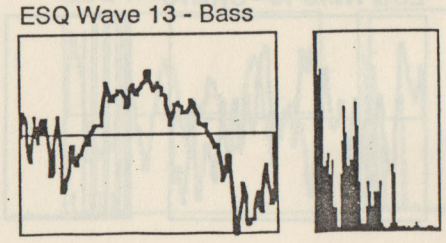
ESQ Wave 11 - Noise 3a



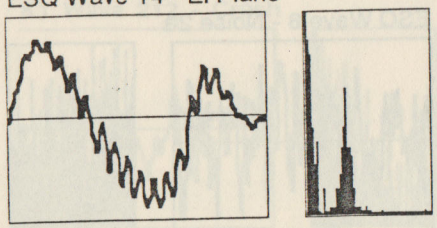
ESQ Wave 12 - Noise 3b



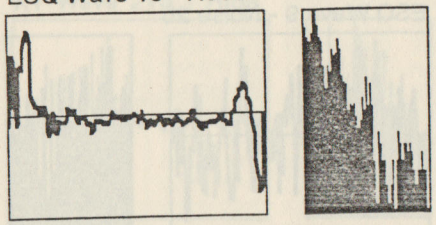
ESQ Wave 13 - Bass



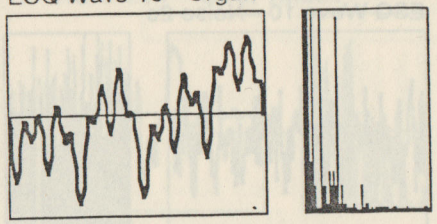
ESQ Wave 14 - El Piano



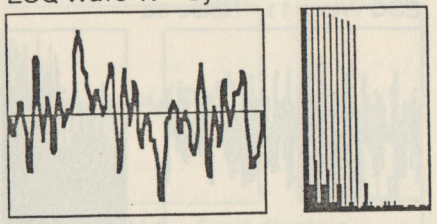
ESQ Wave 15 - Reed



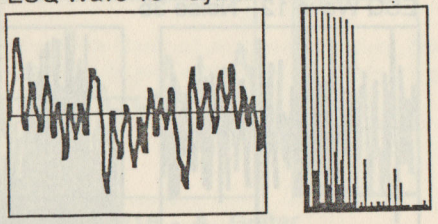
ESQ Wave 16 - Organ



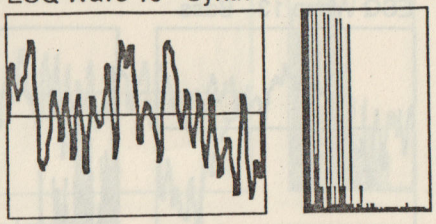
ESQ Wave 17 - Synth 1



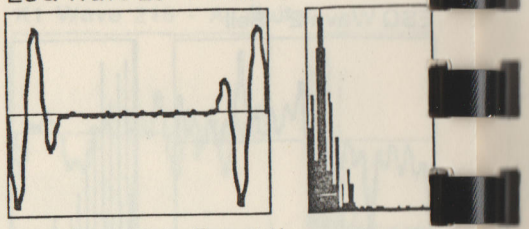
ESQ Wave 18 - Synth 2



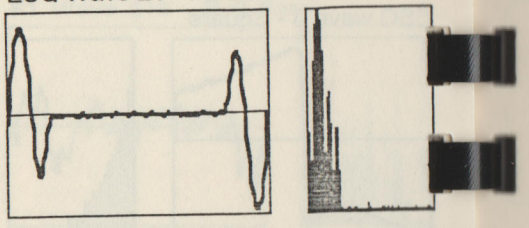
ESQ Wave 19 - Synth 3



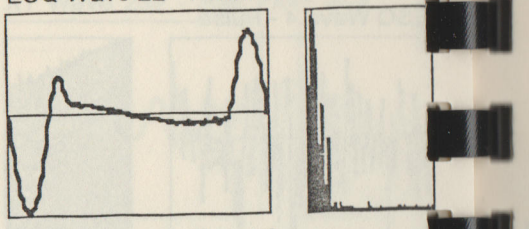
ESQ Wave 20 - Formt 1a



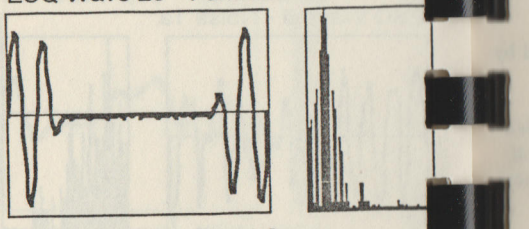
ESQ Wave 21 - Formt 1b



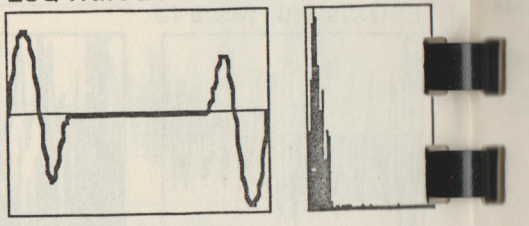
ESQ Wave 22 - Formt 1c



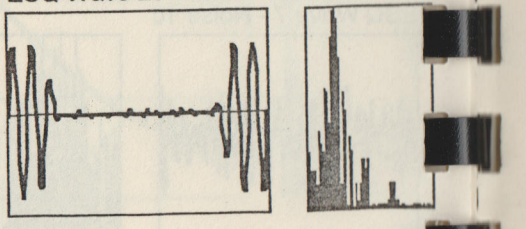
ESQ Wave 23 - Formt 2a



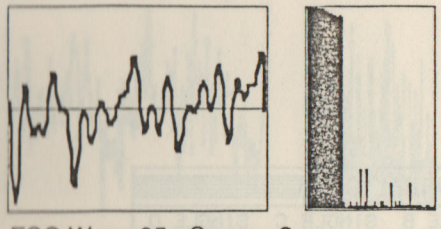
ESQ Wave 24 - Formt 2c



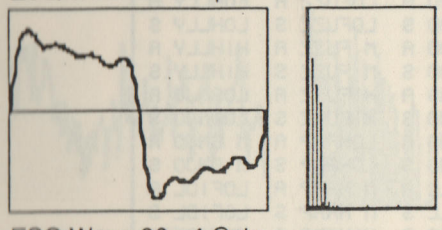
ESQ Wave 29 - Formt 4a



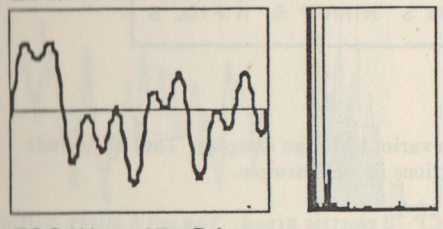
ESQ Wave 34 - Pulse 2



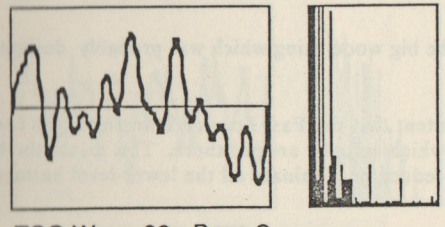
ESQ Wave 35 - Square 2



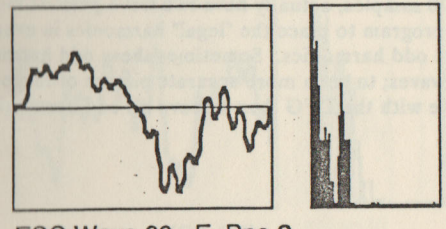
ESQ Wave 36 - 4 Octs



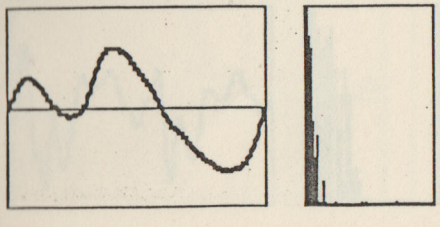
ESQ Wave 37 - Prime



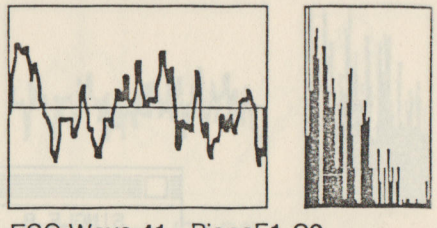
ESQ Wave 38 - Bass 2



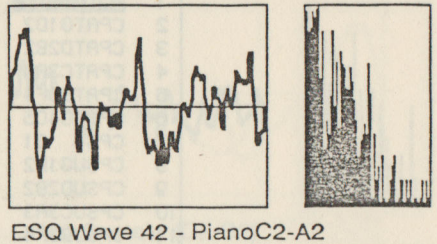
ESQ Wave 39 - E. Pno 2



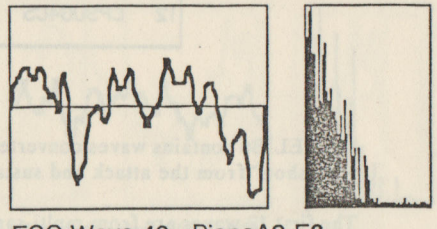
ESQ Wave 40 - Piano to E1



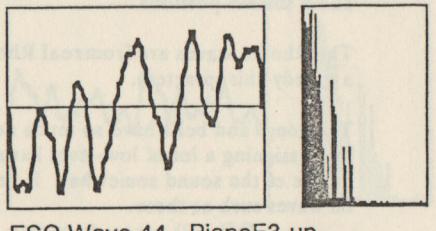
ESQ Wave 41 - PianoF1-C2



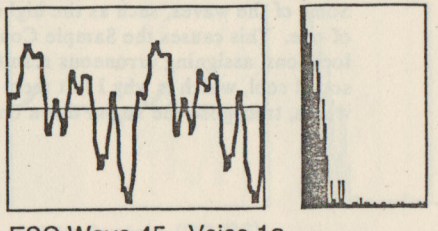
ESQ Wave 42 - PianoC2-A2



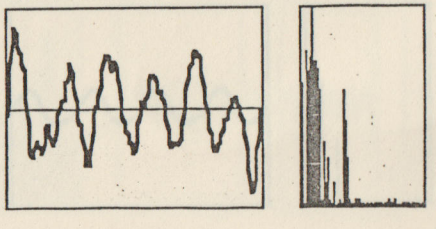
ESQ Wave 43 - PianoA2-E3



ESQ Wave 44 - PianoF3-up



ESQ Wave 45 - Voice 1a



WAVELIB6

	SINGLE A	SINGLE B	SINGLE C	SINGLE D
1	CPAT G1	LORHOD A	LOFUZZ A	LOHLLY A
2	CPATG1D2	LORHOD S	LOFUZZ S	LOHLLY S
3	CPATD2B2	HIRHOD A	M FUZZ A	HIHLLY A
4	CPATC3A3	HIRHOD S	M FUZZ S	HIHLLY S
5	CPATB3F4	LOGONG A	HIFUZZ A	LOBNJO A
6	CPATG4C5	LOGONG S	HIFUZZ S	LOBNJO S
7	CPSU G1	M GONG A	LOHARP A	M BNJO A
8	CPSUG1D2	M GONG S	LOHARP S	M BNJO S
9	CPSUD2B2	ROBELL A	M HARP A	LOFIDL A
10	CPSUC3A3	ROBELL S	M HARP S	LOFIDL S
11	CPSUB3F4	BOBASS A	HIHARP A	M FIDL A
12	CPSUG4C5	BOBASS S	HIHARP S	M FIDL S

WAVELIB6 contains waves converted from various Mirage samples. They all include "snapshots" from the attack and sustain portions of each sample.

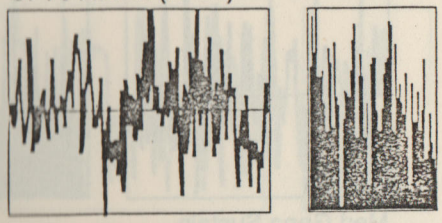
The first 12 waves are from multi-sampled CP-70 electric grand. You get 6 attack portions and 6 sustain portions.

The Rhodes waves are from **real** Rhodes (the big wood thing which was probably designed by a greedy chiropracter).

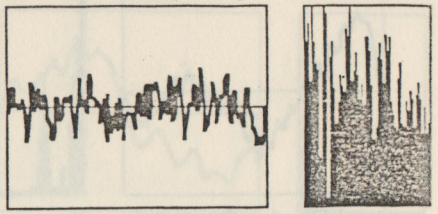
The gongs and bells have so much noise content that the Fast Fourier Transform gets fooled into assigning a lot of low-level harmonics which actually are not there. This masks the bell nature of the sound somewhat. It helps to reduce or eliminate all the lower-level harmonics on waves such as these.

Some of the waves, such as the higher CP-70 samples, actually have two wave periods instead of one. This causes the Sample Converter program to place the "legal" harmonics in even locations, assigning erroneous results in the odd harmonics. Sometimes these odd harmonics sound cool, which is why I left them in the waves; to get a more accurate picture of these waves, transpose the sound down one octave with the DFG then remove all odd harmonics.

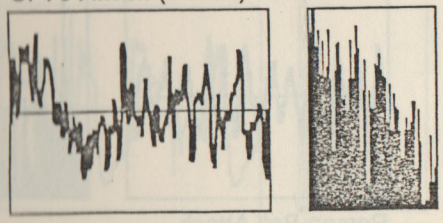
CP70 Attack (to G1)



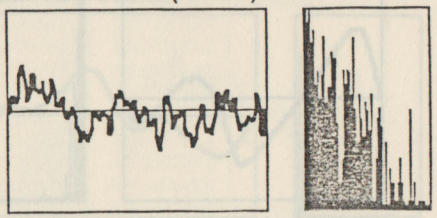
CP70 Sustain (to G1)



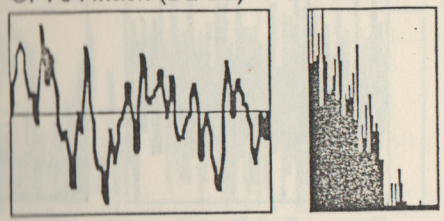
CP70 Attack (G1-D2)



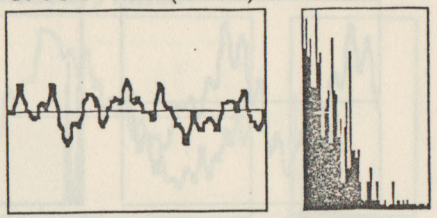
CP70 Sustain (G1-D2)



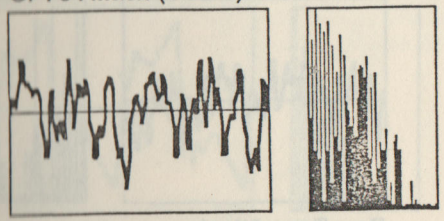
CP70 Attack (D2-B2)



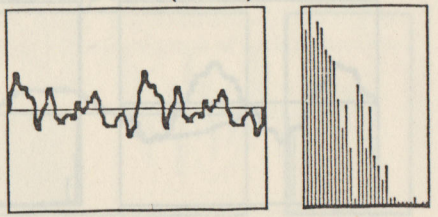
CP70 Sustain (D2-B2)



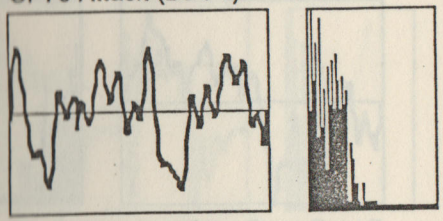
CP70 Attack (C3-A3)



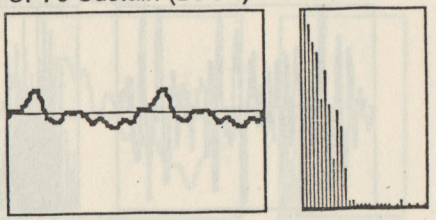
CP70 Sustain (C3-A3)



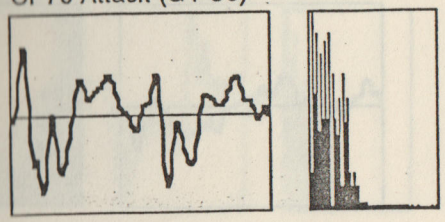
CP70 Attack (B3-F4)



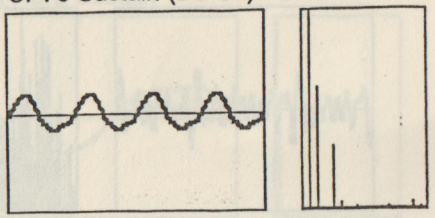
CP70 Sustain (B3-F4)



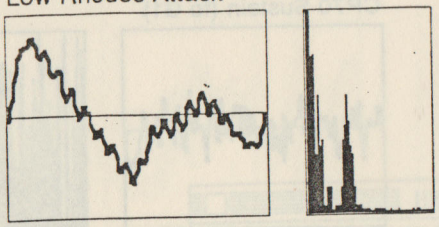
CP70 Attack (G4-C5)



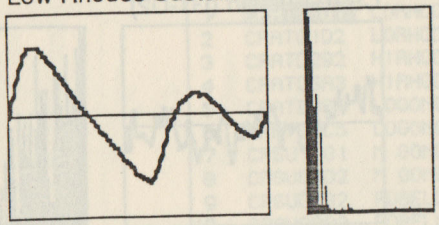
CP70 Sustain (D5-C6)



Low Rhodes Attack



Low Rhodes Sustain



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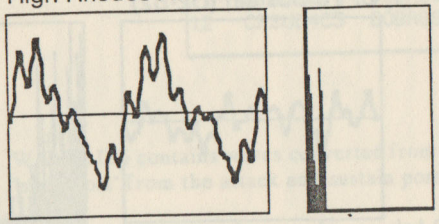
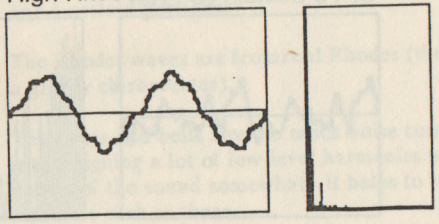
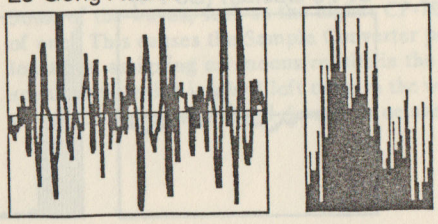


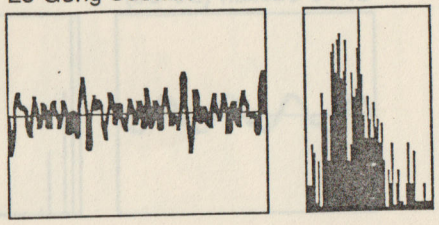
High Rhodes Sustain



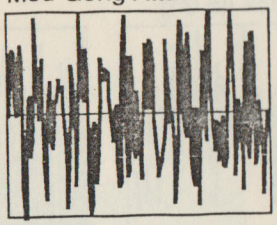
Lo Gong Attack



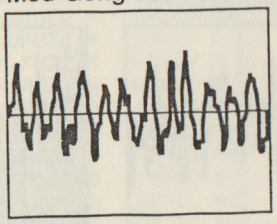
Lo Gong Sustain



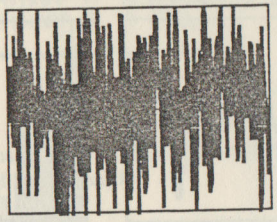
Med Gong Attack



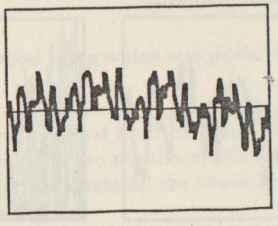
Med Gong Sustain



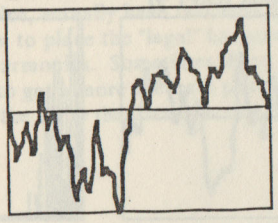
Roman Bell Attack



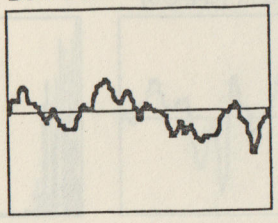
Roman Bell Sustain



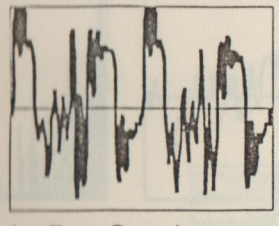
Bow Bass Attack



Bow Bass Sustain



Lo Fuzz Attack



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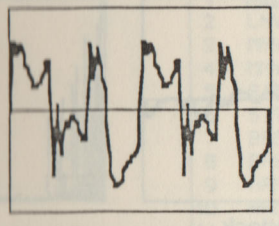
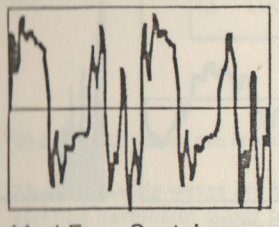


Med Fuzz Attack



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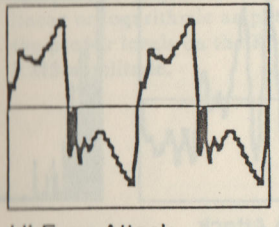
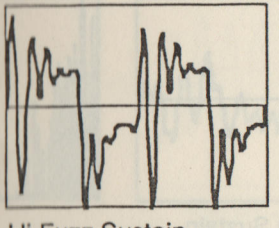
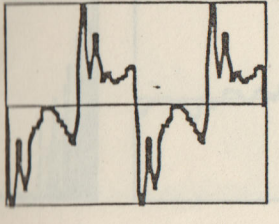


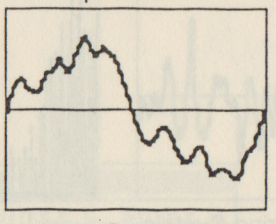
Hi Fuzz Attack



Hi Fuzz Sustain



Lo Harp Attack



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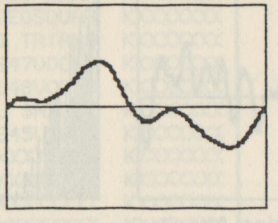

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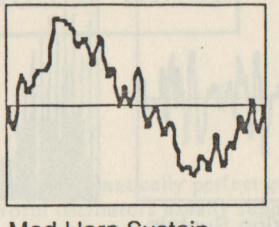
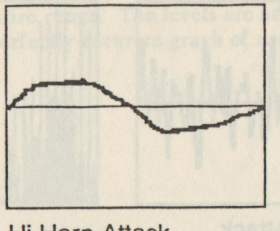
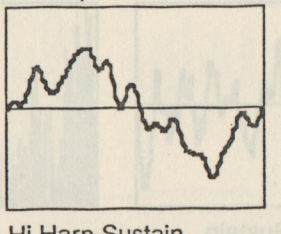


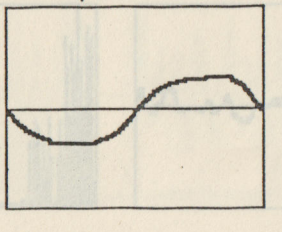
Med Harp Sustain



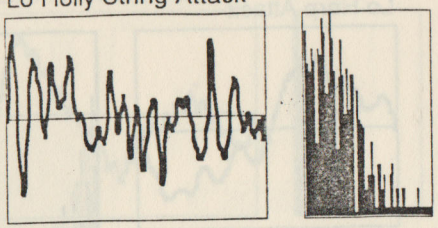
Hi Harp Attack



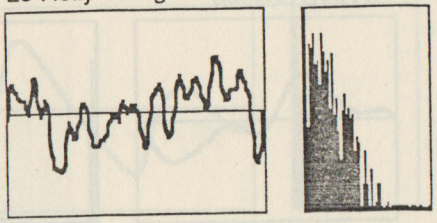
Hi Harp Sustain



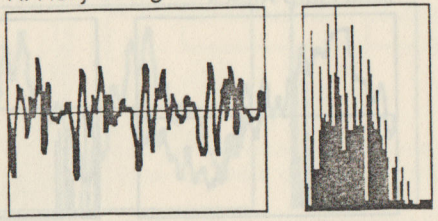
Lo Holly String Attack



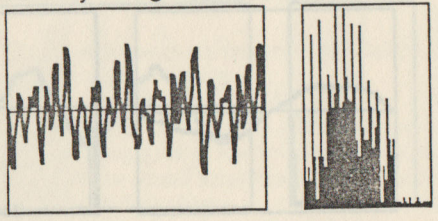
Lo Holly String Sustain



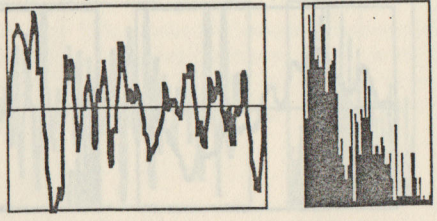
Hi Holly String Attack



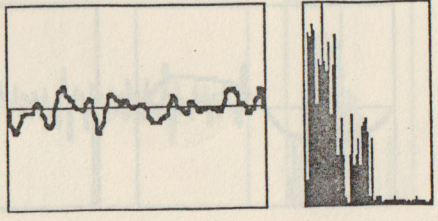
Hi Holly String Sustain



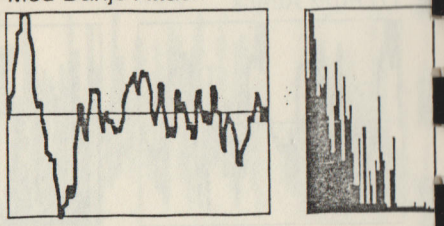
Lo Banjo Attack



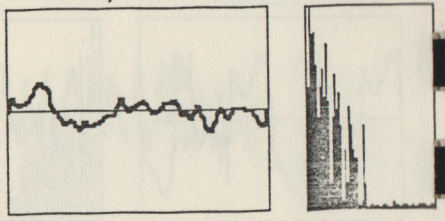
Lo Banjo Sustain



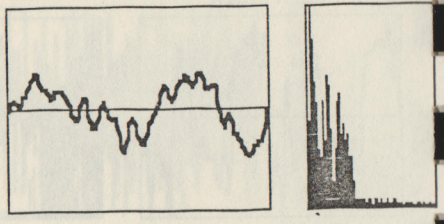
Med Banjo Attack



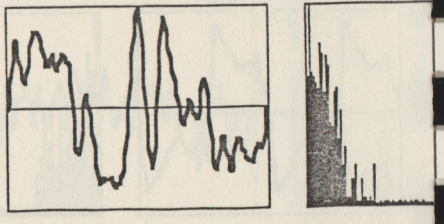
Med Banjo Sustain



Lo Fiddle Attack



Lo Fiddle Sustain



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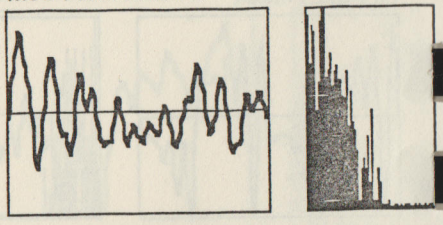
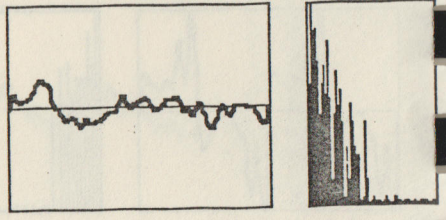


Med Banjo Sustain



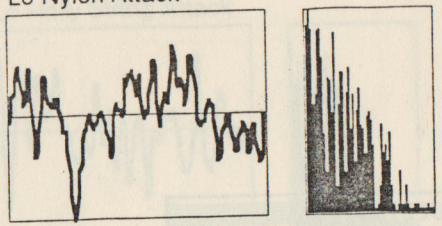
WAVELIB7

	SINGLE A	SINGLE B	SINGLE C	SINGLE D
1	LNYLON A	M CLAR A	GEO RAMP	XXXXXXXX
2	LNYLON S	M CLAR S	GEOSQUAR	XXXXXXXX
3	MNYLON A	HICLAR A	G TRIANG	XXXXXXXX
4	MNYLON S	HICLAR S	E47VOC1C	XXXXXXXX
5	SITAR A	OBOE A	E48VOC1D	XXXXXXXX
6	SITAR S	OBOE S	J SAXES2	XXXXXXXX
7	BASSOONA	TULFLUTA	E45VOC1A	XXXXXXXX
8	BASSOONS	TULFLUTS	XXXXXXXX	XXXXXXXX
9	HRMONCAA	J SAXES	XXXXXXXX	XXXXXXXX
10	HRMONCAS	J BOTTLE	XXXXXXXX	XXXXXXXX
11	LOCLAR A	12 PULSE	XXXXXXXX	XXXXXXXX
12	LOCLAR S	25 PULSE	XXXXXXXX	XXXXXXXX

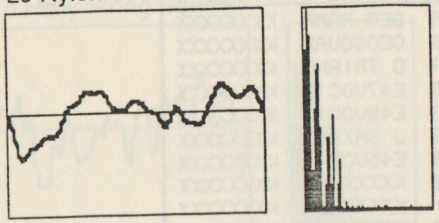
The first 22 waves are from Mirage samples.

The Geometric waves are harmonics calculated from mathematically perfect geometric waves, yielding harmonics closer to the "ideal" than real-world oscillators usually supply. If you compare these plots to those in textbooks, keep in mind that the K5 does not use a strictly linear or logarithmic amplitude scaling over it's entire range. The levels are adjusted to give the proper levels on the K5 rather than to give a perfectly accurate graph of each harmonic's RMS amplitude.

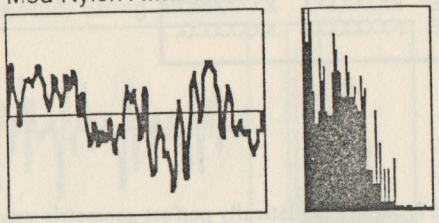
Lo Nylon Attack



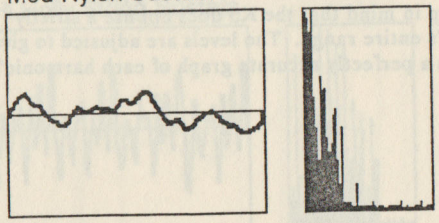
Lo Nylon Sustain



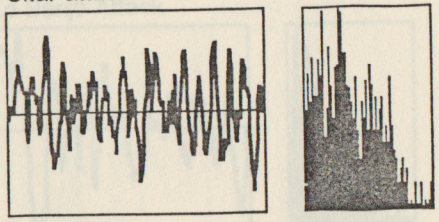
Med Nylon Attack



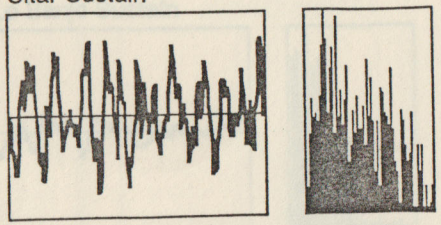
Med Nylon Sustain



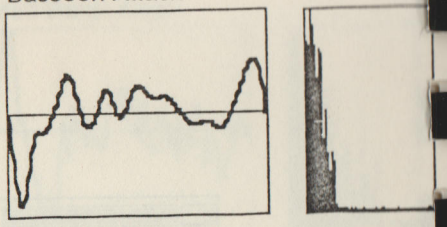
Sitar attack



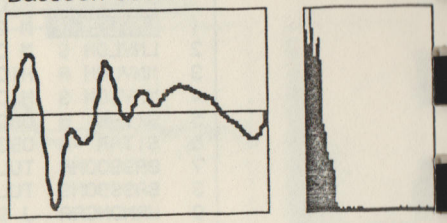
Sitar Sustain



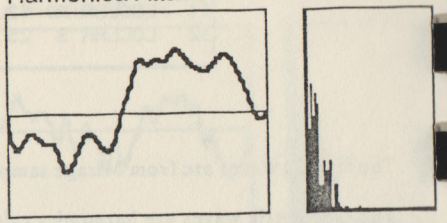
Bassoon Attack



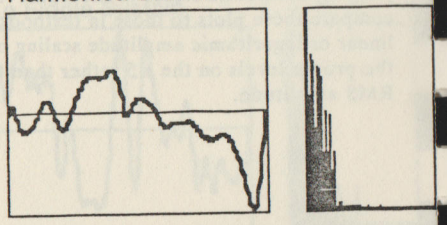
Bassoon Sustain



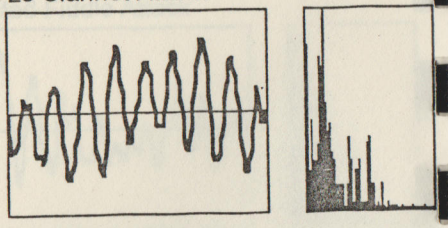
Harmonica Attack



Harmonica Sustain



Lo Clarinet Attack



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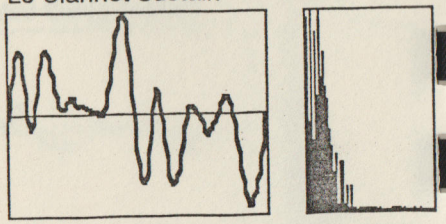

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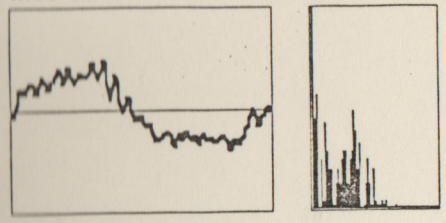

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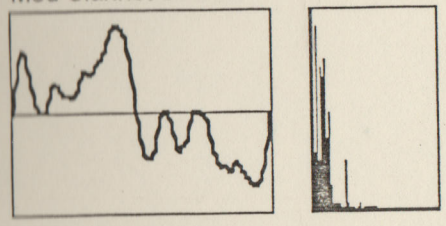
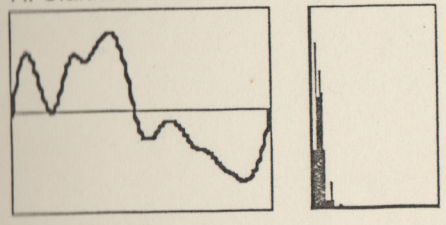
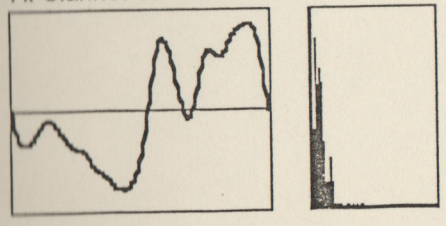


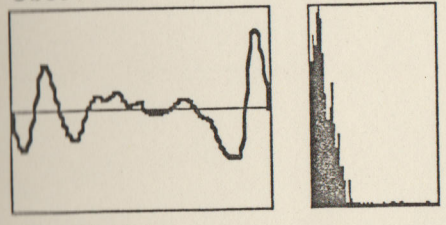
Hi Clarinet Attack



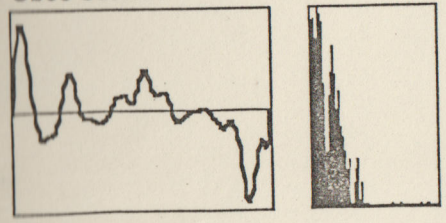
Hi Clarinet Sustain



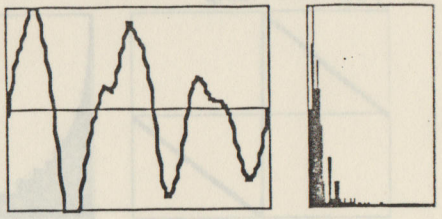
Oboe Attack



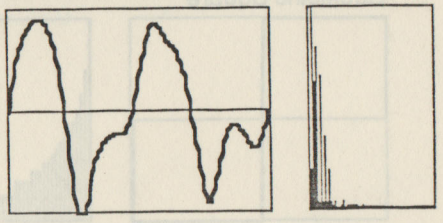
Oboe Sustain



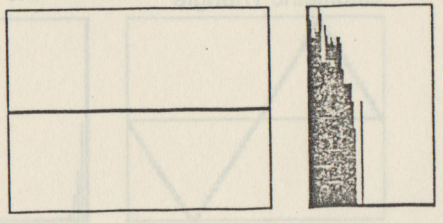
Tull Flute Attack



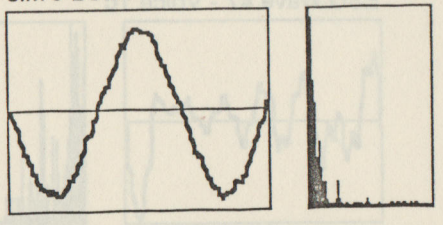
Tull Flute Sustain



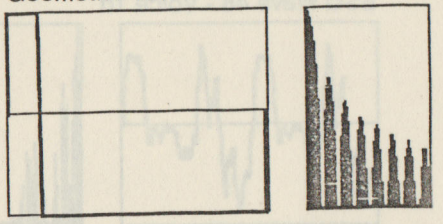
Jim's Saxes



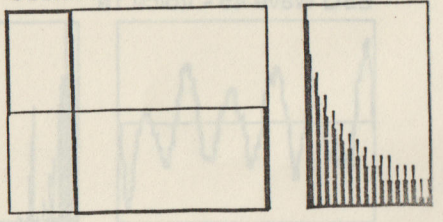
Jim's Bottle



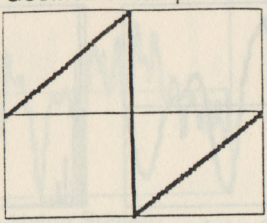
Geometric 12% Pulse

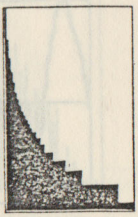


Geometric 25% Pulse

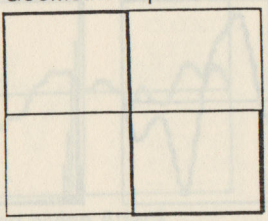


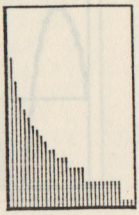
Geometric Ramp



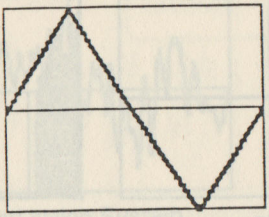


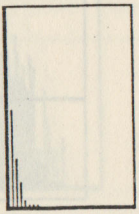
Geometric Square



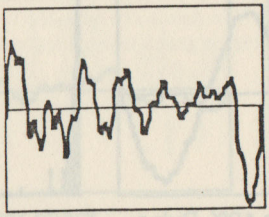


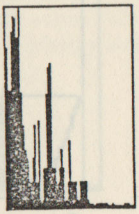
Geometric Triangle



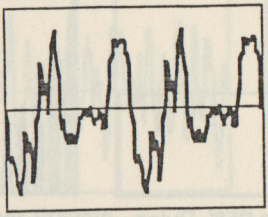


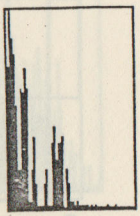
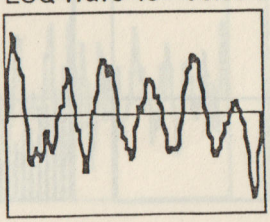
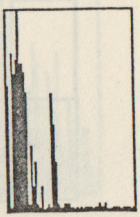
ESQ Wave 47 - Voice 1c





ESQ Wave 48 - Voice 1d





ESQ Wave 45 - Voice 1a